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# NURSING IN THE HOME

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Wm. H. Smith M.D.

# NURSING

IN THE

# HOME

BY

LEE H. SMITH, M. D.

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NINTH EDITION

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A BOOK OF VALUABLE UP-TO-DATE INFORMATION FOR NURSES,  
WITH IMPORTANT DATA TAKEN FROM THE PEOPLE'S  
COMMON SENSE MEDICAL ADVISER.

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BUFFALO, N. Y.

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# PREFACE

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The frequency of accidents of all kinds and injuries sustained, drowning, poisoning, fainting, etc., and sudden attacks of painful diseases, renders it necessary that non-professionals as well as professionals should possess sufficient knowledge of nursing, or caring for the sick and the wounded, to enable them to employ the proper means for speedy relief.

"Nursing in the Home" is written for the ordinary reader. It contains chapters on Emergencies, First Aid, Advice to Expectant Mothers and the Care of Mother and Babe, How to Recognize Different Diseases, the Taking of Temperature, Care of the Wounded, Chapters on Burns, Scalds. Broken Legs, Arms, etc.

The home nurse will find within its pages reliable up-to-date instruction for caring for the sick, and the professional nurse will renew her training. Such a book is invaluable, and should be in the possession of every family.

It is for the welfare of every person not only to understand the means for the preservation of health, but also to know what to do in case of emergency and what remedies to employ for the alleviation of the common ailments of life. To impart such practical knowledge is the object of this work.

THE AUTHOR.

Buffalo, N. Y., March, 1925,



## CHAPTER I

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### BEDS AND THE MAKING OF THEM

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Order, Cleanliness, Bedsteads, The Mattress, Sheets and Blankets, The Draw-Sheet, Pillows, Bed-Making, Turning a Mattress, Changing a Shirt, The Bed-Pan, A Surgical Bed, Care of the Teeth, Mouth and Hair, Turning, Lifting and Raising a Patient, Appointments of a Sickroom, Don'ts for Nurses.

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Among the many important essentials in a hospital ward or a sick room are *order* and *cleanliness*, and that the bed should afford the patient all the comfort possible; therefore, only such beds as can easily be taken apart and cleaned when necessary should be considered. Many years ago some wooden bedsteads were used in hospitals, but in these days when sanitary methods prevail, especially in hospital wards, the iron bedstead 6 feet four inches long by 3 feet wide is preferred, with a wire spring mattress. However, wooden bedsteads are still used in homes and after cases of illness should be thoroughly disinfected and cleaned. The iron beds are easy to renovate and do not harbor insects. In hospitals the bedstead is higher from the floor than in homes, thus enabling the doctor or nurse to handle the patient with greater facility. There are several kinds of mattresses, the one made of hair is generally conceded to be preferable as it is non-absorbent. It should have a covering of linen or cotton ticking, the former is best as it is cooler for the patient. In cases of hip fracture a hard mattress of straw is sometimes used under the hair mattress to prevent sagging, and when epidemics such as cholera, typhus or small pox prevail, the straw mattress is often used, as it can be burned. There are very

comfortable felt mattresses much used in homes, but on the whole the hair mattress leads.

In olden days the good housewives prided themselves on having many feather beds (so-called); they are not now considered sanitary and have been relegated to innocuous desuetude except in remote places. The writer remembers when travelling in Holland several years ago, it was a cold night and the room assigned to us in a country inn was as clean as frequent scrubbing could make it, and there were two fat feather beds, or mattresses, one to sleep on and one for covering.

**Pillows** are usually made of cotton ticking stuffed with feathers, but a covering of linen ticking is cooler and should be used if possible. Often a hair pillow is placed under the feather pillow, and small hair pillows are placed near different parts of the body to keep the patient from moving. A number of small pillows, soft, and hard, should always be available, and there should always be a sufficient quantity of rubber sheeting on hand.

**Blankets** should be of light, soft wool, and the bedspread of the best quality of white dimity, which can be washed easily. The bed clothes are about the same as those commonly used, with the addition of the *draw-sheet*, a most valuable adjunct, a real essential, as it keeps the undersheet clean, and can be replaced as often as necessary. It is a narrow sheet folded across the lower half of the bed under the patient, and can be changed by drawing it gently to one side, substituting the cooler and smoother half, or if soiled it can easily be replaced. The draw-sheet should be made of cotton drill of good quality. All hospitals have them on hand, but in private cases the nurse should see that she has them. Draw-sheets are a necessity, as they not only keep the undersheet clean but can be used with great advantage in case of hemorrhage or other discharges. There is usually a rubber sheet over the covered mattress, under the cotton sheet, and it must be remembered that rubber when in direct contact with the body is apt to be heating and should be used sparingly and with discretion, therefore, the smaller rubber sheet which is sometimes necessary to further protect the bed should be placed under the draw-sheet, tucked well in on both sides and stretched smoothly so as not to wrinkle. Every nurse should know how to make a bed so that it will afford the greatest ease to the patient. The *sheets* must be long and wide enough to tuck in smoothly on both sides, top and bottom, otherwise the patient is rendered uncomfortable. To make a bed properly, fold the upper

clothes except the sheet, and place them over a chair, then put on the patient's robe and slippers, keeping the sheet over him, and help him into an easy chair; the top sheet with the under sheet is then removed and the mattress turned and brushed, being sure that it is scrupulously clean. After this has been attended to if a rubber sheet is used place it over the mattress, then tuck in the under sheet with the draw-sheet over it, as described above, and replace the pillows which have been well beaten. The top sheet should be about six inches above the blanket and spread so as to fold over nicely—now put on the spread evenly, tuck in well at the bottom and let the sides hang. This task being well done the patient is helped into bed and his wrapper and slippers are taken off under cover.

As we have seen, the patient in the case described was in a measure able to help himself, but it is a more careful and delicate proceeding when the patient is helpless, and requires consideration and efficiency. (Fig. 1.)

The top bed-clothes may be taken off as above, except that

the upper blanket and sheet are untucked and the blanket held over the patient while the sheet is slipped out from under the patient who is gently raised and covered by the blanket. One or both pillows, as expedient, are removed, the underclothes loosened and the patient turned to one side, the nurse supporting him. (Two nurses are desirable if the patient is entirely helpless.) Now roll the draw-sheet and under-sheet from the outer side to the center of the bed, brush the mattress, smooth out the rubber sheet, then roll the draw-sheet and clean sheet to the center, substitute them for the soiled ones, unroll the clean ones and

*Fig. 1.*



Method of Changing the Under Sheet

tuck well in, at the same time turning the patient carefully on to the clean side, roll the soiled sheets and repeat the process on the other side.

The patient is placed on his back with the upper sheet over the covering blanket which is quickly slipped off and the bed-making proceeds as usual.

Fig. 2.



Turning the Upper Sheet Without Exposure

In the *surgical* method, which usually includes patients that have undergone operations and are kept in one position, the only difference in making the bed is that the sheets are changed from the top to bottom. The clean sheet is folded crosswise and placed by the soiled sheet which is rolled from the upper end of the bed

to the patient's shoulders and the clean sheet well tucked in. (Fig. 2.) From either side of the bed the nurses raise the patient just enough to pull the soiled and clean sheets down to the hips. This is done by each nurse placing the hand near the bed under the shoulders of the patient. The pelvis is then raised and the clean sheet pulled

Fig. 3.



Lifting the Patient

straight and smooth, and tucked in and the work is finished as usual. In such cases draw-sheets are invaluable, save frequent changing of under-sheets and prevent disturbing the patient.

A strong, capable nurse can usually lift a patient alone by placing

the hands across the body, one over the pelvis, the other behind the shoulders, and drawing him toward her. (Fig. 3.) A certain dexterity is required in lifting which sometimes counts more than mere strength; however, in cases of extreme weakness where the head needs support there should always be two nurses if obtainable.

Little things mean a good deal to one who is obliged to lie in bed enduring pain. Feverish and irritable patients are often much eased and soothed by the simple act of turning the mattress.

Two nurses are required for this work which is carried out as in bed-making, the pillows removed and the patient covered with a blanket (Fig. 4).

*Fig. 4.*



Turning the Mattress, the Patient in Bed

The patient is gently moved to one side of the bed, the loosened clothes rolled up near him and the nurses standing side by side seize the mattress from the far side and draw it across exposing the wire mattress, which is then covered with three pillows and the patient is moved on to them with the bedclothes under him. The mattress is turned from top to bottom, made up fresh, if necessary, and the patient is moved on to it. When the patient is feverish and the mattress is turned often, a clean undersheet is not always required; a fresh draw-sheet answering all purposes. The patient being settled comfortably back on the mattress, the pillows are removed and the mattress drawn back into place.

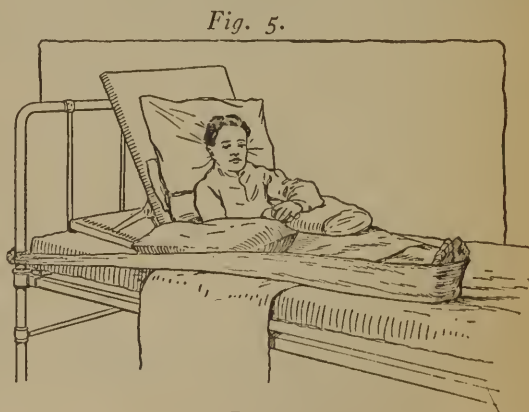
Instead of the above method an easier way is to use a fresh mattress already made up with clean sheet and draw-sheet, and move the patient on to it, taking off the old mattress and drawing the fresh one into position. This method can usually be carried out in hospitals where there are plenty of mattresses always on hand, but it is not likely to be used in homes.

In the following chapter the bed-bath will be described as well as other methods of bathing patients. The process of giving a bed-pan must be carefully and intelligently undertaken, and in hospital wards a screen should always be placed around the bed. In homes this is not necessary as the nurse is alone with the patient. The bed-pan of enamel is now generally preferred, as it is lighter than porcelain and more comfortable for the patient.

Taking off a patient's shirt requires deftness and skill. The *modus operandi* is to first loosen the neck of the shirt and bring the back half over the shoulders, drawing off one sleeve and slipping the shirt over the head, when it comes off easily by gently drawing off the other sleeve. The *sound* arm should be handled *first* if one is injured, but in putting on a shirt the *injured* arm is handled first, reversing the order of procedure.

Little attentions go a long way in comforting patients who are feverish and enduring pain. Changing the pillow is often a great relief, even turning it so that the head rests on the cool side is a comfort. A drink of water should be frequently given in most cases and when the patient is able to sit up in bed, "Back rests" are much enjoyed

(Fig. 5). They are frames of wood with canvas stretched on them, and there are also frames called bed-cradles (Fig. 5, page 15) which serve the purpose of taking the weight off the bedding when necessary, and often afford great



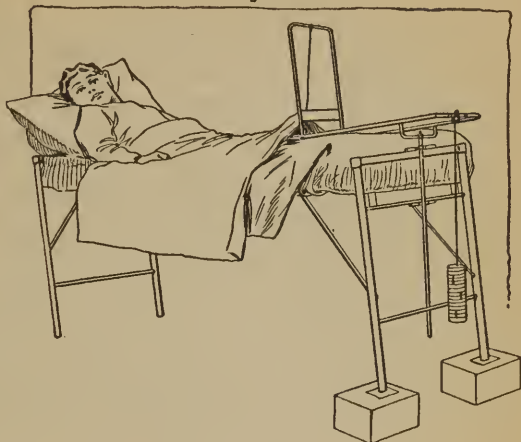
Back Rest

relief, and in severe cases of fracture there are beds with sliding extension and leg splint. (Fig. 6.)

Right here we reiterate the necessity of extreme cleanliness in all ways—this is winning half the battle toward recovery. The *mouth* and *teeth* should be especially cared for, and when the patient

is able he should brush his own teeth in the morning and after each meal. If the patient is too weak the nurse should attend to this most necessary duty, as many cases of infection have been known, for the mouth often harbors many disease germs which can spread to the glands of the ear and other parts of the body, and one way to counteract this is to keep the mouth and teeth scrupulously clean.

Fig. 6.



The Hawley Bed'

The daily use of an antiseptic mouth wash of listerine, thymol or boric acid mixed with water is agreeable and beneficial. Where the tongue is coated the patient should be induced to drink water several times daily.

The care of the hair is a necessity, especially in women's wards. If the hair is not carefully brushed, combed and braided daily it becomes matted, when it is difficult to disentangle it. As a rule the heads of all patients, male and female, should be washed when admitted to a hospital ward. Any good nurse is competent to attend to it, and the trained nurse who attends to patients in private homes must see to it that she has everything on hand necessary to facilitate her duties.

A nurse should not only attend to all the above duties but should be exceedingly careful in giving medicine, always reading attentively the label on the bottle or box, when she takes it up, and again after the dose is measured. Another thing to keep in mind is that the respiration and pulse must be looked after before taking temperature. Observing these three things is most essential: *Pulse, respiration and temperature*,—and should never be omitted.

Many people who live in apartments, hotels or boarding houses are obliged to go to hospitals when they are very ill, others who

have homes prefer going where there is sure to be many modern appliances that are not found in a private house, while still others prefer to stay at home.

When a nurse is called to minister in a home to a patient who is likely to be ill for some time, if such preparations have not already been carried out, she should select a room that is light and airy, with a hardwood floor if possible, having only a few small rugs which can easily be cleaned. If a carpet is down, and a room with a hardwood floor is not available, it should be covered with tea leaves and gone over with a carpet sweeper each day, avoiding all dust. There should be no heavy draperies in a sick room, and short muslin curtains at the windows which must be laundered often. The wall paper should be of a soft neutral tint. Patients are sometimes much annoyed by paper with showy patterns, and there should be only one or two good pictures, preferably woodland scenes, which lead the patient's imagination to cool and sylvan solitude, or perhaps a reproduction of some famous painting like the Sistine Madonna. All these things though seemingly trivial are not, because the imagination plays a large part in every one's makeup and particularly do they appeal to a patient who is obliged to remain in bed; all the surroundings should be cool and restful to the eye, and the food daintily served—even a cup of tea in a pretty cup tastes better than in a plain, heavy one. Women especially, enjoy thin porcelain dishes and dainty appointments. In a private house when flowers are sent to a patient (as they are apt to be) only a few should be allowed in the sick room, as the strong perfume often produces headache. We can learn something about artistic arrangements from our Oriental neighbors, the Japanese, who seldom use more than one flower in a vase. One long stemmed rose of rare quality is shown with pride to a visitor and its exquisite beauty pointed out. We of the Occident are too apt to crowd things, producing a sense of confusion, while a few really good things have a quieting effect. An important duty for the home nurse in caring for a patient whose disease is infectious, like typhoid, dysentery, typhus or cholera, is the disinfection of bacteria in the excreta, and also the disinfection of the sick room after such a case. One of the best of the modern disinfectants is Formaldehyd. It is a germicide of great value and destroys all germs or insects in a closed room by generating vapor, preferably through a Formaldehyd fumigator.

## DON'TS FOR YOUNG NURSES:

**Don't** forget to have everything ready when you begin.

**Don't** fail to see that the room is warm enough and draughts excluded when you take the patient out of bed.

**Don't** lean on a bed or jerk it. This may cause the patient much pain.

**Don't** forget that in lifting, raising or turning a patient, skill and time are required.

**Don't** work alone in lifting a feeble patient if another nurse is available.

**Don't** be careless or rough in handling a patient, even though he may be heavy and irritable—be gentle, and use your brains as well as your hands.

**Don't** fail to be sympathetic, at the same time cultivating a quiet and dignified manner.

**Don't** under-estimate the value of *suggestion*. A nurse can do much toward the patient's recovery by suggestion, which modern thought now recognizes as a valuable adjunct to surgery and medicine.



“The power of thought—the magic of the mind.”

## CHAPTER II

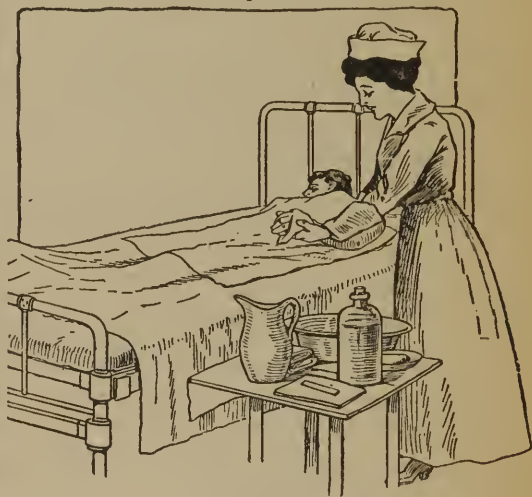
### BATHS

#### The Bed-Bath, The Tub-Bath to Induce Sweating, The Sitz-Bath, The Foot-Bath, The Hot Pack, The Hot Air Bath, Cold Sponge, etc.

One of the daily duties of the nurse is giving the bed-bath. All things necessary should be near at hand, including a wash-basin, a pitcher containing hot water, coverings to protect the patient,

*Fig. 1.*

bedclothes, two wash-cloths, a slop jar, a face and a bath towel, a hand brush, alcohol, soap, talcum powder and a hot-water bag half filled, to put at the patient's feet. Scented soap and bath crystals are agreeable adjuncts, which for some persons are soothing. Men as a rule dislike perfume, therefore, a pure unscented soap is preferable.



Giving a Bed Bath

The coverings used, under and over the patient, are usually of old woolen sheets or blankets, but a large bath towel will answer for the under one, a rubber sheet beneath, and one of the bed blankets for a covering. When all is ready, first wash the face, ears and neck carefully with a sponge, or preferably, a soft wash-cloth well soaped; rinse with clear water and dry thoroughly. Then wash each arm in turn, keeping the hand in the warm water while the exposed arm is being washed, the

nurse soaping her hands and rubbing the patient's hand between them. Rinse one arm, dry thoroughly, and repeat the process with the other arm and hand. The nails need special attention and should never be neglected. Use a soft hand brush for this purpose. Now, keeping the patient under cover, wash with a fresh cloth the chest and abdomen, holding the blanket away from the body with one hand. Patients who are able, are usually glad to wash the genitals themselves, but when a man is very weak and helpless, the nurse should put aside any false notion of modesty, remembering that "to the pure, all things are pure," and do her duty, not neglecting these parts which are liable to chafe and become inflamed if not properly attended to. The folds of the thigh, the armpits and the navel should receive special care, and if the latter has become sore or clogged a daily soap poultice should be applied until healed.

The water in the basin having been replenished from the pitcher, the legs are now washed and dried in turn in the same manner as were the arms, keeping the feet in the warm water. (Fig. 2.) The last thing in bathing the patient is to turn him over and wash the back and hips; then he is rolled on to the freshly made half of the bed, and if the

*Fig. 2.*



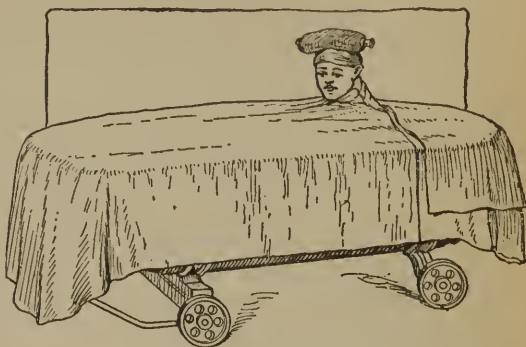
Foot Bathing

under sheet is not soiled, only a clean draw-sheet is necessary, the underclothes removed and the daily bath is over. An alcohol rub should follow, as it serves to restore circulation, and all creases and sensitive joints should be powdered. These details if carried out prevent bed sores caused by uncleanness and the weight of the body. A really capable nurse will not neglect to observe all symptoms of redness, and except in rare cases, it is inexcusable to allow bed sores on a patient. A common cause of these painful sores is crumpled bedclothes and the careless giving of the bed-pan, which irritates the skin.

There are many kinds of baths, among which the tub-bath used in hospitals to induce sweating (Fig. 3) is resorted to in

cases where it is necessary. A portable tub is rolled beside the bed, half filled with water as hot as can be borne by the patient. The tub is covered with two blankets pinned at the patient's neck, the head only being exposed. Boards across the tub prevent the blankets yielding, and they should be drawn as smoothly as possible. An ice bag is placed on the patient's head and he is given cold water to

*Fig. 3.*



Tub Bath to Induce Perspiration

drink. The pulse must be taken at the large artery in front of the ear and if it becomes weak, the patient must be removed at once. When extreme heat is applied to the body, cold should be applied to the head to prevent giddiness by the blood rushing to the head. In cases of sudden weakness the patient should be given a half teaspoon of aromatic spirits of ammonia in a wine-glass of water. When the patient has remained in the hot water the required length of time, usually about six or seven minutes, he is quickly wrapped in a warm blanket and put in bed with hot water bottles at his feet and sides, is well covered and given a drink of water, the ice-bag still on his head. About an hour later the hot water bottles are removed and he is rubbed under a fresh blanket with warmed towels, then rubbed with alcohol and his shirt (warmed) put on. This is similar to the method employed in Turkish Baths only it is carried out differently, the object being to carry off impure matter by way of perspiration. The hot tub-bath in hospitals is often used to break up a severe cold and in chronic forms of kidney disease.

The Sitz bath is valuable in overcoming the retention of urine and other painful inflammation. The patient sits in tempered water from the thighs to the waist. A blanket folded around the neck and pinned with a safety pin covers the patient and the legs

are wrapped in a separate blanket. In cases of painful retention of urine the bath lasts until the patient is relieved, usually a half hour or less. The hot foot-bath which draws the blood from the head, is a well-known method and needs no detailed description. If given in the bed, the clothes should have the protection of a rubber sheet; if in a chair, the patient should wear a bed wrapper and have a blanket kept over the limbs and bath.

In hospital wards there are pans of different sizes and shapes, made specially for the constant immersion of limbs which have become putrid. As patients so inflicted are, as a rule, nursed in a hospital, substitutes for these pans are not often used, although in an emergency, surgeons have used for immersing a leg, a long metal flower box, and for an arm, a large kettle. Hammocks are made of strips of webbing to support the limbs while in the water, which is kept steadily at an even temperature.

Another method in typhoid fever is the tank or constant immersion treatment in special cases. This is not much used now, but is still employed in cases of large sores or wounds and extensive burns. The tub used is portable and full-sized, and should be provided with a stop-cock in order to empty it easily. The tub is filled with a sufficient quantity of hot water and the patient is supported by a hammock of wide webbing while the head lies on a circular rubber cushion, also kept in place by strips of webbing. As in the tub bath to induce sweating, boards are placed across the tub and covered with rubber sheet and blankets. The patient remains constantly immersed in the warm water except that once daily he is taken out, gently placed on a mattress, wounds or sores attended to, and the bowels evacuated; this is very necessary. It is obvious that in cases where the bowels move frequently, this method is not practical. It is not advisable to disturb such patients by moving.

It is important that the nurse write down the respiration, temperature and pulse of the patient before and after giving a bath; these are three vital signs. Normal temperature is  $98\frac{3}{5}^{\circ}$  F. or  $37^{\circ}$  C., being a little higher at night. In conditions indicating fever, the temperature rises to  $101^{\circ}$  or  $102^{\circ}$ .  $104^{\circ}$  F. *indicates a dangerous condition.*

Temperature is usually taken by the mouth, using a Clinical Thermometer, which is placed *under* the tongue and the lips kept closed for about four or five minutes. If the patient is too weak to let it remain in the mouth, or if he is delirious, the temper-

ature may be taken in the armpit or in the rectum. When the latter method is used the thermometer should be oiled and then inserted about one inch in the rectum. The nurse must wash the thermometer *before and after* using and keep it in some antiseptic solution. *Extreme cleanliness is imperative.*

The Hot Pack and the Hot Dry Pack are both beneficial in certain cases. These are sweat baths, whose purpose as in the ones already described, is to induce perspiration. (Fig. 4.)

In giving a sweat bath of any kind the nurse must not forget to apply a cold compress or an ice-bag to the head and to give the patient water to drink frequently. To give the hot-pack the patient's shirt must be taken off and he is laid between two blankets on a rubber sheet, all well warmed. Then he is wrapped in other light weight blankets that have been wrung dry in scalding water, arranged so that the air is excluded from all parts of the body. The patient being snugly encased in the blankets, he is covered with the bedclothes and left from twenty minutes to an hour. Some patients are too weak to remain more than twenty minutes, while others are benefited by remaining longer. The nurse should be the judge of this, *carefully watching* all symptoms of exhaustion, and frequently taking the pulse, preferably at the temple. The wrappings removed, the patient is put between hot blankets and if sweating is over he is quickly dried with warmed bath towels. His shirt having been warmed is put on, the rubber sheet and underblankets removed, and he is covered with the ordinary bedclothes, a hot-water bag being placed at his feet and allowed to remain a while to prevent any danger of a chill. Two nurses should be employed in this operation.

Of late years the hot pack, where *water* is used, has been in a

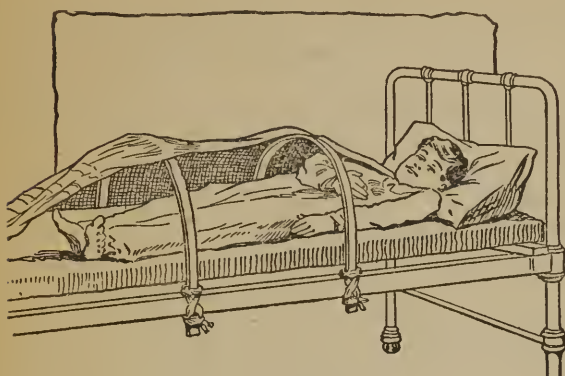
Fig. 4.



The Pack

measure superseded by the *Hot Dry Pack*. The Sweat Bath used when the patient is confined to the bed is arranged in the form of a

Fig. 5.



Bed Cradle

cabinet by taking two bed-cradles, (Fig. 5) and covering them with rubber sheets and blankets, making in this way a closed cabinet which is heated by the use of a special appliance consisting of an alcohol lamp of large size placed on

a stool by the bed—the chimney, covered with asbestos, extends through a small opening in the covering. A thermometer is attached to the cabinet, as far as possible from the hot air, where it is easily reached, and should be consulted in keeping the desired temperature. A croup kettle may be used when moist heat is needed, the spout inserted inside the covering, and when electric light is procurable, an electric drop-light is tied to a bed-cradle and hangs in the center of the cabinet. Great care should be exercised in using electricity.

Fig. 6.



The Cold Sponge

To reduce temperature and control fever, modern hospitals are using the cold

sponge (Fig. 6), and the cold affusion (Fig. 7). The former is carried out by first removing the patient's shirt and the top clothes, covering him with a sheet or blanket not too heavy. A rubber sheet should protect the under bedclothes and a cold compress or ice-bag is kept at the patient's head, a hot-water bag at his feet. The articles needed are, a basin of chopped ice, an icebag, a hot water bag, a thermometer, a basin with sufficient water of the required temperature, regulated by adding ice at intervals, and a good sized wash-cloth. The patient is then sponged quickly and in long firm strokes exposing the chest and limbs in turn. The back also is sponged in like manner. Then the rubber sheet is rolled away, the shirt put on, and the patient covered as usual. In giving the cold affusion the patient is in a sort of *trough* of rubber formed by two rubber sheets under him. (Fig. 7.) These cover the entire bed, the lower end of one long enough to be put in a foot-bath which is on the floor. Then the patient is surrounded with rolled blankets, pillows or any desired article to keep things in place, the head on a pillow, thus forming a trough of rubber. This done, a large loin cloth is wrapped and pinned around the patient and coverings removed, the head of the bed being raised on blocks. Next, a rubber hose is put on a cold-water tap and the patient is sprayed over the body commencing at the chest and ending with the back, the water being carried off into the foot tub. This is rather a

heroic method and is not much used except in cases of extreme fever with the temperature abnormally high. In such cases it may be life-saving. The pulse must be watched closely in giving this treatment as well as all others. "Safety First" is a good motto for the nurse and will save her many regrets.

Fig. 7.



The Cold Affusion

For those who need medical care, Dr. Pierce's Invalids' Hotel

and Surgical Institute, in Buffalo, N. Y., is a splendidly equipped hospital and in this famous institution can be found all the modern appliances for giving baths. One of these, not commonly found in hospitals, is "The Baker." In one corner of a pleasant little room on an iron and nickel standard with four legs, rests a large oval aluminum receptacle, within which is a sliding couch. The patient is undressed and enveloped in a bathrobe of turkish toweling with mits and leggings of the same absorbent material, then placed on the couch and wrapped snugly in thick blankets; the gas jets underneath are lighted to give the heat, and the couch is rolled into the "Baker," leaving the head outside on an air pillow, with a cold compress on the forehead. This is frequently changed. Before placing the patient in the "Baker," the nurse observes the temperature, pulse and respiration of the patient, and also regulates the heat, and when there are any signs of weakness after being in the "Baker," immediately removes the patient. Usually profuse perspiration takes place in from fifteen to twenty minutes, when the patient is removed to an adjoining room and given a warm bath, then dried, placed on a couch and given an alcohol rub, covered with a sheet and light blanket and left to rest an hour. In the same room with the large "Baker" is a smaller one with an opening in the side for the purpose of inserting an arm or a leg, the patient sitting near it on a chair and when sufficient perspiration has been induced, the bath is given as above.

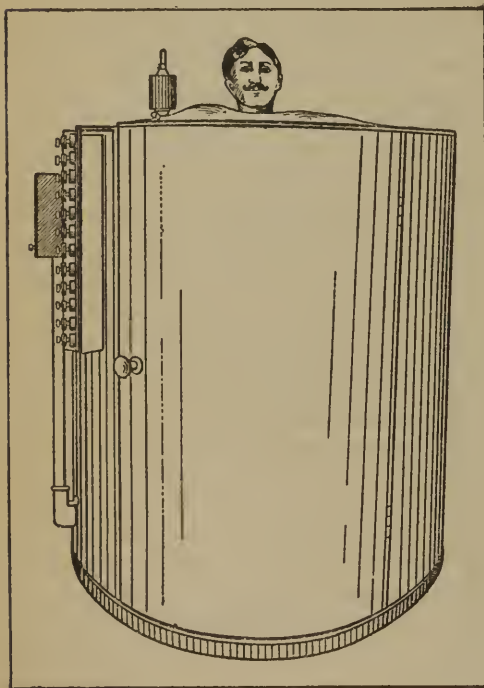
Modern scientific investigation has accomplished marvels in many ways, and one of the most wonderful is the development of the X-rays, enabling the surgeon to locate the seat of many obscure maladies in a way not known to medical men fifty years ago. The old saying, "There is nothing new under the sun," recalls the hint of such practices in very old books ages ago, and it may be that many things in the passing of centuries were known in the long ago—then forgotten, and now re-discovered. At Dr. Pierce's Invalids' Hotel the X-ray Laboratory contains the most modern apparatus and to those not conversant with the X-ray, it is indeed a wonder. Many believe that the X-ray reveals only the bones and foreign bodies such as bullets, but this is not so. Most of the soft tissues and organs can now be examined by the X-rays, so as to definitely determine their condition. Diseases of the lungs, heart, liver, kidneys and digestive tract are clearly diagnosed by this means.

Then there is the Violet-ray treatment which is operated by

concentrating the violet rays upon any part of the body, and the Incandescent Light Bath, or Electric Bath, where the patient is bathed in the electric rays. The one at Dr. Pierce's Invalids' Hotel is one of the few to be found in sanitariums.

It consists of a large galvanized cabinet within which

*Fig. 8.*



Electric Bath Cabinet Closed.

the patient sits on a chair with the head out through an opening at the top (Fig. 8). The entire interior of the cabinet is surrounded with electric bulbs—the dazzling light enveloping the nude body of the patient, producing the necessary heat to induce perspiration and propelling a vivifying current through the system, the healing effect of which in many cases is remarkable. After the patient has perspired sufficiently—the length of time varies, but is usually from fifteen to twenty

minutes—he is placed on a slab as in a Turkish Bath, given a soap scrub, then sprayed with warm water, gradually cooled, dried with turkish towels, given an alcohol rub and placed to rest an hour on a couch.

## CHAPTER III

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### BATHS AND MOTION AS REMEDIAL AGENTS

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The remedial effects of bathing are generally under-rated. This want of appreciation is more often due to the improper manner in which it is performed than to an insufficiency of curative virtues. The term *bathing* not only implies a cleaning of the body or certain portions of it, but also the application of water in such a manner as to influence the nervous system, and regulate the functions of the secretory organs. Cleanliness, while it preserves health and promotes recovery, has reference only to the hygienic influences of water and not to its curative effects. There are several kinds of baths, the names of which indicate their character, manner of application, or the part of the body to which they are applied. Among others, we have Cold, Cool, Temperate, Tepid, Warm, Hot, Hot Air, Russian, Turkish, Vapor, Electric, Sea, Shower, Sponge, Douche, Sitz, Medicated, Alkaline, Acid, Iodine, and Sulphur Baths. Temperature influences the properties of any bath; thus the sponge, sitz, and alkaline baths may be employed warm or cold, according to the effect desired.

**The Cold Bath**, used at a temperature of from 40° to 60° Fahr., is powerfully sedative, and is employed for its tonic effects. If the vital powers are low, or the individual remains in it too long (two or three minutes should be the limit), the reaction is slow and its effects injurious. While it is highly invigorating to robust persons, those who have a low standard of vitality should be cautious in its employment. A local bath

may be followed by beneficial results, when a general bath would be inadmissible. For these reasons we advise the general use of the

**Cool Bath**, at a temperature of from 60° to 70° Fahr. If, in any instance, the *reaction* is *slow*, we recommend the

**Temperate Bath**, at a temperature of from 75° to 80° Fahr. The time of remaining in the bath should be regulated by the strength of the invalid. As a rule, it should not exceed three *minutes*, and the colder the water the less time should the patient be immersed. Immediately after emerging from the bath, the body should be thoroughly dried and rubbed with a moderately coarse towel until a glow is experienced and reaction is fully established. The attempt to toughen children by exposing them to low temperatures of either air or water, cannot be too emphatically condemned. This caution, however, does not apply to the employment of moderately cool water for ablutions. The cold or cool bath should be taken in the early part of the day, but *never during digestion*. Whenever reaction does not follow bathing, artificial means must be resorted to, as stimulating drinks, dry warmth, or exercise.

**The Tepid Bath**, the temperature of which is from 85° to 92° Fahr., is generally used for cleansing the body. It is prescribed in fevers and inflammatory affections for its cooling effects. It is usually medicated with some acid or alkali. The latter unites with the oily secretion of the skin and forms a soapy compound easily removed by the water. The temperature should be regulated according to the vitality of the patient, and the bath may be repeated two or three times a day. It removes superfluous heat, and keeps the skin in a condition favorable for excretion.

**The Warm Bath**, at a temperature varying from 92° to 98° Fahr., is always agreeable and refreshing. It equalizes the circulation and softens the skin, by removing all impurities. It moderates pain and soothes the whole system. It does not weaken or debilitate the person, but is in every way beneficial. It is an efficient, remedial agent in many chronic diseases, convulsions, spasmodic affections of the bowels, rupture, rheumatism, and derangement of the urino-genital organs. It should be employed immediately before going to bed unless

urgent symptoms demand it at other times. It may be medicated or not, as circumstances require, but should always be taken in a warm room.

**The Hot Bath** at a temperature of from 98° to 110° Fahr. is a powerful stimulant. It excites the nerves, and through them the entire system. It causes a sense of heat and a constriction of the secretory organs; but perspiration, languor, and torpor soon follow. In the sudden retrocession of cutaneous diseases, it restores the eruptions to the surface and gives speedy relief. The hot bath may be applied locally when circumstances require.

**The Russian Bath** consists in the application of hot vapor, at a temperature varying from 112° to 200° Fahr. The patient is first subjected to a moderately warm temperature, which is gradually increased as he becomes inured to it, the head being surrounded with cloths wet in cold water. Upon emerging from it, the bather is plunged into cold water or receives a cool, shower bath. In rheumatic and cutaneous diseases, chronic inflammations, and nervous affections, the Russian bath is an effective remedy.

**The Turkish Bath** is a dry, hot-air bath. The bather passes from one apartment to another, each one being of a higher temperature than the preceding. He undergoes a thorough shampooing, and, although the person may be scrupulously clean, he will be astonished at the amount of effete matter removed by this process. The bather then returns through the various apartments, and, upon emerging from that of the lowest temperature, he experiences a delightful sensation of vigor and elasticity.

As a hygienic agent, the hot-air bath has been constantly growing in favor. Its value is now recognized by all physicians throughout the world. The judicious use of the Turkish bath serves to secure perfect equalization of the circulation. Glandular activity is increased, elasticity and power given to the muscles, and a permanent, stimulating and tonic influence imparted to the system, a condition at once conducive to the enjoyment and prolongation of life. Dr. Erasmus Wilson, of England, says, in a paper read before the London Medical Association: "The inhabitant of a large city would live as

healthy, immured within city walls, as amid the fields and meadows of the country. His bath would be to him in the place of a country house or horse—it would give him air, exercise, freshness, health, and life.”

“The bath that cleanses the inward as well as the outward man; that is applicable to every age; that is adapted to make health healthier, and alleviate disease, whatever its stage or severity, deserves to be adopted as a national institution, and merits the advocacy of all medical men; of those whose especial duty it is to teach how health may be preserved, and how disease may be averted.”

The hot, *dry* atmosphere of the Turkish bath promotes rapid evaporation from the surface of the body, and it is well known that rapid evaporation from the surface is a cooling process. A person's finger may be frozen in one minute's time, by throwing upon it a constant, fine spray of rhigolene or sulphuric ether. The rapid evaporation of the light fluid congeals the liquids of the tissues and a film of ice is rapidly formed upon the part. In a less intense degree the same cooling process is carried on over the whole surface of a person, when in the hot room, or *sudatorium*, of the Turkish bath. The evaporation from the surface is so rapid that one can hardly appreciate the profuseness of the perspiration going on. The evaporation from the surface so rapidly carries off the heat from the body that one finds himself able, with little or no inconvenience, to remain in a room heated to from 180° to 200° or even 220° Fahr.

As a hygienic measure to be regularly or occasionally employed by persons in fair health, the Turkish or hot dry-air bath is far superior to the Russian or vapor-bath. (1.) It produces more profuse perspiration, and is therefore more depurating, or cleansing, in its effects. (2.) It does not relax the system, but rather produces a tonic effect, and fewer precautions are, therefore, necessary to guard against taking cold after employing it. (3.) The Turkish bath can be better ventilated than the Russian. While the air is heated to a high temperature, it can be readily kept pure by constant changes. In the Turkish hot-rooms, or *sudatorium*, of the Invalids' Hotel and Surgical Institute, provision is made for bringing underneath the floors a current of fresh air from without. This column of fresh air is carried under the centre of each room where it

escapes from the conductor, is warmed, and rises into the room, from which extraction of air is constantly going on through registers opening into tubes, communicating with large ventilated shafts which are kept hot, summer and winter, to insure a draught through them. In this manner, thorough ventilation of our Turkish hot-rooms is insured.

The Turkish bath not only combines a most agreeable luxury with a decidedly invigorating and tonic influence, but also, by its stimulating power, induces proper glandular and cellular activity, producing a healthy condition.

Sallowness, tan, and freckles, the result of local or general increase of the pigment granules of the skin, soon disappear under the stimulating influence and regular use of the Turkish bath, which causes rapid development of new and transparent cells. The colored granules are thus gradually replaced and the skin assumes a beautiful clearness and purity of appearance, which transcends immeasurably the unhealthy hue that follows the frequent employment of the various cosmetics.

The value of an agent which thus improves the general health, insures immunity from coughs, colds, and other diseases, and at the same time produces a healthy and permanent beauty of complexion, is at once apparent. The purity of person, perfect circulation, increase of healthy nutrition and glandular activity produced by the Turkish bath, serve to make it of the most lasting utility.

The eminent Dr. Madden has said, and his experience is confirmed by every regular patron of the bath, that, "Wherever the Turkish bath was a national institution the hair of the women was peculiarly luxurious and beautiful. I can vouch for it that the use of the bath rendered the complexion more delicate and brilliant; that the eyes became clearer and brighter; all the personal charms were enhanced. I can recommend no hygienic measure more beneficial or effectual in preserving the health and an attractive personal appearance."

Pimples, blotches, eruptions, and other disfigurations of the skin are removed by the frequent use of the Turkish bath, leaving the integument smooth and soft.

## How the Turkish Bath is Administered at the Invalids' Hotel and Surgical Institute.

The hot-rooms, of which there are two, are exactly similar in every respect except as regards temperature. The first room has a temperature of from  $110^{\circ}$  to  $120^{\circ}$  Fahr. The bather is supplied by the attendant every few minutes with copious draughts of cool water. Gradually the relaxing influence of the elevated temperature manifests



First Hot-room of the Turkish Bath.

itself. The capillaries slowly dilate, the veins enlarge under its gentle stimulus, and small points of perspiration appear upon the surface, which assumes a slight, rosy blush. A delightful calm, a feeling of perfect rest and luxurious ease is imparted to the senses. From this room, after an appropriate interval, the bather enters the second room, in which the atmosphere is higher by from  $20^{\circ}$  to  $30^{\circ}$ , and it may be made still higher, its regulation requiring but an instant.



One of the Shampooing-rooms.

A thorough sweating occurs while the subject remains in these rooms, during a period of from ten to forty minutes. The secretions of the skin, at first impure and loaded with the *débris* of dead cells and extraneous matter, gradually become purer, and clearer, until, finally, all trace of color disappears and the pearly drops of sweat come full and free. Soon the attendant appears and leads the

way to the shampooing-room, where, lying upon a warm marble slab, *massage* is applied most thoroughly to every portion of the body.

By the *massage*, shampooing, or rubbing, the superficial veins are thoroughly emptied of their contents, the muscles are given elasticity and tone, and glandular activity is promoted. Innumerable dead epithelial cells, together with other impurities, are rolled off in flakes under the skillful manipulation of the attendant.

After a thorough shampooing, the shower bath is applied, to secure a contraction of the capillaries and a diminution of the perspiration.

**The Spirit Vapor-bath** is very effective when employed in the earlier stages of acute, febrile, inflammatory, and painful diseases. In many forms of chronic diseases the administration of a spirit vapor-bath once in from three to fifteen days, is a valuable adjunct to the treatment of these affections. It exerts an exceedingly beneficial influence upon the entire system, and, when habitually employed, may ward off disease.

The body should be moistened with an alkaline solution before the administration of a spirit vapor-bath. After the perspiration which it occasions has subsided, which will usually be in from three to four hours, sponge the body with a mixture of the following ingredients: water, three gills; alcohol, one gill; salt, one teaspoonful. By this method the patient experiences none of the unpleasant effects which generally follow the employment of diaphoretics. Various kinds of apparatus have been devised to facilitate the application of the spirit vapor-baths. Most of them are cumbersome and expensive, and, consequently, are seldom used except in hospitals or sanitariums.

The following method described by Dr. J. King, may be advantageously employed :

“The patient is undressed, ready for getting into bed, having removed the clothing worn through the day and put on a night shirt or other clothing to be worn while sweating, and during the night, if the bath is taken at bed-time. He is then seated on a high Windsor or wooden-bottomed chair, or instead thereof, a bench or board may be placed on a common open bottomed chair, care being taken that the bottom is so covered

that the flame will not burn him. After seating himself, a large coverlet or blanket is thrown around him from behind, covering the back of his head and body, as well as the chair, and another must be passed around him in front, which last is to be pinned at the neck, loosely, so that he can raise it and cover his face, or remove it down from the face from time to time as occasion demands during the operation of the bath. The blankets must reach down to the floor, and cover each other at the side, so as to retain the vapor. This having been done, a saucer or tin vessel, into which is put one or two tablespoonfuls of whisky, brandy, alcohol, or any liquor that will burn, is then placed upon the floor, directly under the centre of the bottom of the chair, raising a part of the blanket from behind to place it there; then light a piece of paper, apply the flame to the liquor, and as soon as it kindles let down the part of the blanket which has been raised, and allow the liquor to burn until it is consumed, watching it from time to time to see that the blankets are not burned. As soon as consumed, put more liquor into the saucer, about as much as before, and again set it on fire, being careful to put no liquor into the saucer while the flame exists, as there would be danger of setting fire to the blanket, and producing injury to the patient. Continue this until the patient perspires freely, which, in a majority of cases, will be in five or ten minutes."

"If, during the operation, the patient feels faint or thirsty, cold water must be sprinkled or dashed in his face, or he may drink one or two swallows of it,—and in some cases the head may be bathed with cold water. As soon as free perspiration is produced, wrap the blankets around him, place him in bed, and cover him up warm, giving him about a pint of either some good store tea, ginger, or some diaphoretic herb-tea to drink, as warm as he can take it. After two or three hours, remove the covering, piece by piece, at intervals of twenty or twenty-five minutes each, that he may gradually cease perspiring."

The above method may be improved by using an ordinary hoop skirt, ten to twelve inches below the bottom of which is suspended a larger and stronger hoop. The upper and smaller hoops should rest upon the patient's shoulders. A woollen blanket, large enough to reach and rest upon the floor, and

envelop the whole person, is thrown over the hoops. Unless the bath is employed to diminish the quantity of fluids in the body (as in dropsy), the patient may drink some simple, diaphoretic infusion, to hasten or facilitate perspiration. When he perspires freely, small quantities of cold water may be frequently given. "There is little or no danger of taking cold after this process, if ordinary precaution is observed, and it is easy, agreeable, safe, and effectual."

Occasionally we will meet with patients, upon whom it is almost impossible to produce the slightest moisture, much less perspiration. The skin of such persons is generally dry and harsh, communicating an unpleasant sensation to the touch. In most instances the skin may be restored to its normal condition, by adopting the following course: 1st. Anoint the whole surface of the body and limbs with olive oil every night upon retiring to bed. 2nd. Every morning wash the whole surface with a warm, weak, alkaline solution, employing considerable friction while drying. 3rd. Every two weeks administer a spirit vapor-bath. A perseverance in this course for a few months will accomplish the desired result."

Frequent reference to spirit vapor-baths will be made by the author of this work, in speaking of those diseases in which its employment will prove beneficial.

**Sea Bathing** is an excellent, remedial agent in chronic disorders, particularly in those of an atonic character, such as nervous prostration, dyspepsia, and general debility.

Much of the benefit attributed to this mode of bathing is undoubtedly due to other influences, such as pure air, exercise, change of scenery, diet, and associations which surround the patient during his sojourn at the sea-shore.

At first, the duration of a sea-bath should not exceed three or five minutes, but it may be gradually prolonged to fifteen or twenty minutes. If the patient is very feeble, one or two baths a week are sufficient, and the most robust person should never take more than one a day. They should always be taken in the earlier portion of the day, before breakfast if possible, and *never during digestion*.

Before entering this bath, a moderate degree of exercise should always be taken, enough to arouse the vital energies, but

not to produce fatigue. Suitably dressed, the patient plunges into the water, in which he remains during the prescribed time. Immediately after emerging from the bath, the patient should be thoroughly dried and dressed and then moderate exercise should be taken to induce reaction. If the reaction is slow, a mild stimulant may be taken and the duration of the bath must be diminished the next time. When sea-bathing is beneficial improvement is soon manifested. The blood becomes richer, the whole system is strengthened and the functions are performed with more regularity. To the rich, sea-bathing is a luxury, but it is a remedy beyond the reach of the poorer classes unless they live near the sea-shore.

**The Shower Bath** produces a shock to the nervous system by suddenly coming in contact with the skin. Numerous streams of cold water fall upon the neck, shoulders, and body of the patient who stands beneath the hose or reservoir. When the patient is plethoric, feeble, or nervous, or when some internal organ is diseased, the cold, shower bath should *not* be employed. In simple debility unaccompanied by inflammation or symptoms of internal congestion, its use proves advantageous. By moderating the force of the shower, and substituting tepid water, the most delicate persons can endure it and profit thereby. The usual means for inducing a good reaction, friction, and exercise, should be employed.

**The Douche Bath** consists of a stream of water, dashed or thrown upon the patient from a moderate height or distance, with considerable force. The size, temperature, and force of the stream may be modified to suit the exigencies of the case. It is locally employed as a remedy for sprains, weak or stiff joints, old swellings, etc. The cold, douche bath is more powerful than the shower bath and should be given with the same precautions which govern the application of the latter.

**The Sponge Bath** admits of extensive employment in both acute and chronic diseases, and its simplicity renders it of untold value. It consists in a general or local application of water (medicated or not) at any desired temperature. The quantity may be great or small to suit the requirements of the case. If it is applied in acute diseases at a temperature agreeable to the patient, it is exceedingly grateful and may be repeated as often as necessary. It may be rendered alkaline by

the addition of some compound of soda, in the proportion of a teaspoonful to a quart of water. A portion of the body may be bathed at a time, and quickly dried, thus avoiding any exposure to cold. It removes excessive animal heat, relaxes the capillaries, equalizes the circulation, and produces comfort, tranquility, and sleep.

Nothing is more conducive to the health and comfort of laboring men in summer than a daily bath, and it is a matter of regret that conveniences for the purpose are not in every home, especially those in the country. Farmers in particular need bathing facilities, and yet in many cases they are almost entirely without them. For their benefit we will describe a device which we can recommend to all who want a cheap, convenient, and easily managed apparatus for sponge bathing in the bed-room.

The articles required are a piece of rubber-cloth a yard and a quarter square, four slats, two inches wide and three feet long, notched at the ends so as to lock together in the form of a square, and a large sponge. The slats are placed upon the floor and the rubber cloth is spread over them (there is no need of fastening it to the slats), forming a shallow square vessel a yard wide. In this the bather stands and applies the water with a sponge from a basin or bowl on a stand placed conveniently near. There need be no danger of wetting the carpet, or spoiling the furniture.

When the bath is finished, gather three corners of the rubber cloth in the left hand, take the fourth corner in the right in such a way as to form a spout when lifted or held over the slop-jar or bucket. The water may be poured out in a moment, when the cloth should be spread over the back of a chair to dry, and the slats unlocked and set away in a closet.

**The Head Bath.** A shallow basin contains the fluid for the bath; and the patient, assuming a recumbent position, immerses a portion of the head, generally the back part. The temperature may be warm, cool, or cold, as desired.

**Medicated Baths** are infusions of vegetable or other substances in water. They are sometimes applied with the sponge, though generally the patient is immersed. The temperature at which they are usually employed is that of the tepid

bath. The nature and strength of the medication depends upon the character of the disease for which it is employed.

**The Alkaline Bath** is prepared by dissolving half a pound of carbonate of soda in sixty gallons of water. It is useful in those diseases in which the fluids of the body are abnormally acid, as in rheumatism.

**The Acid Bath** is prepared by adding two pounds of muriatic or hydrochloric acid to sixty gallons of water. A much smaller quantity of the acid is sometimes used, and in some instances vinegar is substituted.

*Scott's Acid Bath* is composed of nitro-muriatic acid (aqua regia) and water. It should be prepared in a wooden tub, and a sufficient quantity of acid used to give the water a sour taste. It is extensively used in India as a remedy for disorders of the liver.

**The Iodine Bath** is composed of the following ingredients: Tincture of iodine, two drachms; iodide of potassium, four drachms; water, forty gallons. It should be prepared in a wooden tub. It reddens the skin. For children, a much weaker solution must be employed. Its use is generally restricted to scrofulous and tubercular affections.

**The Sulphur Bath** is prepared by dissolving eight ounces of sulphuret of potassium and two ounces of dilute sulphuric acid in sixty gallons of water. The acid may be omitted.

**A Sulphur Vapor-bath** is often employed in cities where the necessary apparatus can be procured. It may be improvised by placing sulphur on a shovel over hot coals. The patient should be prepared as in the spirit vapor-bath, and burning sulphur substituted for the liquor. The patient is then enveloped in the fumes of sulphurous oxide. Heating a mixture of sulphur and sulphuric acid, produces the same result. If the gas is inhaled in large quantities it causes irritation of the respiratory passages, and suffocation. It is therefore necessary that the coverings should be securely fastened at the neck, and that the room be one which can be quickly filled with pure air. This bath is used in cutaneous, rheumatic and syphilitic disorders.

**Fomentations** consist of the general or local application of woolen cloths wrung out of hot water. They should not be so light as to be ineffectual, nor so heavy as to be burdensome. They should not be wet enough to drip, nor applied so as to expose the body to the surrounding air. A fresh cloth should be ready for application before the first one is removed, and the change quickly effected. Fomentations are effectual in relieving congestion and inflammation.

### MOTION AS A REMEDIAL AGENT.

The stability of the planetary system depends upon the concerted motion of its parts. So in the human system, motion is a fundamental principle which underlies every vital process. Health consists in normal, functional activity. The human system is the arena of various kinds of motions, both of fluids and of solids, and life and health depend upon these physiological movements. There are the movements incident to *respiration*, the expansion and contraction of the walls of the chest, bringing the oxygen of the air into contact with the blood as it circulates through the lungs, Corresponding with the movements of the chest are the *motions of the abdominal walls*, which promote the functions of the organs of the abdominal cavity.

There are *motions of the heart and arteries*, which urge the blood out to the extremities and diffuse it through every part of the system, and also *motion of the blood in the capillaries*, by which the blood is circulated through the tissues, that the latter may be built up from its nutritive constituents. Then there is the *motion of the vital current* in the veins returning towards the heart, and urged forward by the muscular and pump-like action of the chest and abdominal walls. The peristaltic *motions of the stomach and bowels* urge onward digesting materials, exposing them successively to different solvents and aiding the absorption of nutritive matter. No less essential to life and health are numerous other minute operations or *motions*, on which vital power in all its manifestations of muscular and nervous energy depends. Many other *motions* are consequent upon decay, growth and repair. Oxygen, carbonic acid, watery vapors, and other gaseous matter are constantly being exchanged between the system and atmos-

pnere. Then, the human system being a complex, chemical laboratory, there are *motions consequent upon chemical action*, constantly going on within it.

*Muscular motion*, under the direction of the will, is also absolutely necessary for the maintenance of good health.

Animal heat and muscular and nervous power are dependent upon motions of the minutest particles composing the body. The body is composed of fluid and semi-fluid matter, permitting great freedom of motion. Health requires that there shall be *a constant change of place*, an active transmission of material to and from vital organs and parts, through the medium of blood-vessels, as well as outside such vessels; that is, motion of interstitial fluids.

**Nature's Mode of Sustaining Health.** The act of transforming latent, non-vital force which exists pent-up in food, as heat is in coal, into vital energy, requires the simultaneous elimination from the system of a like amount of worn-out matter. Assimilation of nutritive materials is impossible, unless a like amount of matter be eliminated from the system. Muscular and nervous energy are dependent upon activities which cause waste. Not only is this true in a general way, but it is also true that the energy produced by the operations of the vital system has a strict relation to the wasting products—that *full energy is only attained by perfected waste*. Use, waste, and power, then, sustain definite and dependent or corresponding relations, since waste is as essential to health as is supply.

Without waste, disturbance is at once produced in the system similar to that resulting from the introduction of foreign matter. These disturbances constitute disease. The more obvious effects of lack of waste and elimination are mechanical. The circulation is loaded with effete and useless matter, the vessels being thereby weakened and distended, and the circulation retarded. The capillaries become clogged and vital action is diminished. Local congestions, inflammations, effusions, morbid growths, and other pathological results follow.

Deranged or suppressed action characterizes, and, indeed, constitutes all departures from health which we call disease. Suffering indicates action, but action which is perverted into

wrong channels, or action in one part at the expense of motion in other parts, constituting a disturbance in the equilibrium of forces, from which the system suffers.

**Value of Mechanical Movements and Manipulations for the Treatment of Chronic Diseases.** To correct and restore deranged movements, thereby producing normal, functional activity of every organ and part of the system, must therefore be the chief object of the physician. All remedies, of whatever school or nature, imply motion, and depend for their efficacy upon their ability to excite motion in some one or more elements, organs, or parts of the system.

While we do not wish to detract from the real merits of medicine as a curative agent, yet we must admit that the remedial power of motion, transmitted either manually or mechanically, is founded upon rational and physiological principles. All systems of medicine, however much they may differ superficially, propose, as the chief end to be attained by the administration of medicine, or by other treatment, that *motions* identical with physiological activity should be incited or promoted. How best to accomplish this result, and with least cost to vitality, is an important consideration. Bearing in mind the conservation of forces, that energy or power is as indestructible as matter, that it may be changed into other forms but never lost, it is plain that mechanical force may be applied to the living system and transformed into vital energy; that chemical action, animal heat, and magnetism may represent in the system the mechanical force transmitted to the body. Keeping in view the transformable nature of force, and the need that our systems have of auxiliary power in different departments, when normal activity is impaired by disease, we can readily understand how undoubted, curative effects result from either the manual or the mechanical administration of motion.

**Rubbing** is a process universally employed by physicians of every school for the relief of a great diversity of distressing symptoms, is instinctively restored to by sympathizers and attendants upon the sick, and constitutes one of the chief duties of the nurse. Uncivilized people resort to this process as their principal remedy in all forms of disease.

The difficulty in administering motion as a remedial agent by manual effort, such as rubbing, kneading, oscillating, flexing and extending the limbs, lies in the impossibility of supplying the *amount, intensity and variety* of movement required to make it most effective. The power of the arm and the strength of the operator are exhausted before the desired effect is produced. Inventive genius has at last overcome the obstacles to the successful and perfect administration of motion as a curative agent. We have now a series of machines propelled by mechanical power, by the use of which we rub, knead, manipulate, and apply in succession a great variety of movements to all parts of the body. These machines transmit motion to the body from inexhaustible sources, never tire, but are ever ready for new, remedial conquests. The movements administered by their use, *while entirely under the control of the patient*, are never disagreeable, and are far more rapid and intense than can possibly be given by the hands. By the application of short, quick movements of from *twelve to fifteen hundred vibrations a minute*, deep-seated organs and parts are reached, to which motion is transmitted and in which vital energy is thereby generated. The hands have not the power, by kneading, manipulating, or rubbing to impress the system except in a very mild degree, and deep-seated organs and parts are scarcely influenced by the comparatively slow movements thus administered. Among the most important, mechanical inventions devised for administering motion as a remedial agent, is one which has received the name of the *manipulator*.

**The Manipulator.** With this machine motion can be applied to any organ or part of the system, and intensity of the application regulated to a nicety. The rapidity of motion necessary to produce active exhilaration of any part of the body is easily secured by the use of the manipulator, but is far beyond the power of the hands. The degree of circulation given to the fluids, both inside and outside of the vessels, and of energy imparted to the organs and parts operated upon by the manipulator, is also unapproachable by the application of manual power.

**Effects Upon the Circulation and Nutrition.**

The influence of motion on these functions is as follows: The contents of the blood-vessels are moved onward by the pressure and motion transmitted by the manipulator, all backward movement of the blood being prevented by the valves of the veins and by the propelling power of the heart and arteries. Fluids outside these vessels pass through their walls, and take the place of the stagnant blood that has been moved onward. Other blood flows into the part, and thus active and healthy circulation is induced, and nutritive material, capable of affording vital support is also brought to refresh the local part.

We have found mechanical movements especially effectual in paralysis, neuralgia, sleeplessness, and other nervous affections; in derangements of the liver, constipation, and dyspepsia, in displacements of the uterus and congestion, and inflammation of the pelvic organs.

For a complete description of the mechanical movements and the machinery employed in the treatment of diseases at the Invalids' Hotel and Surgical Institute, the reader is referred to the addenda to this work.

## CHAPTER IV

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### HYGIENIC TREATMENT OF THE SICK

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There are two essentials requisite to the successful treatment of the sick: (1.) Medical skill; (2.) Good nursing. The former is necessary in order that the condition of the patient be fully understood, and the proper means be employed to effect his recovery. The latter is essential, in order that all influences favoring the production and development of disease may be removed, the tendencies to restoration be promoted by every possible means, and the directions of the physician be properly observed.

Success in the treatment of the sick requires good nursing. Without it, the most skillful physicians fail to effect a cure; with it, the most unqualified may succeed. If certain hygienic agencies are essential to the maintenance of health, how much more necessary it is that they be employed in sickness! If certain conditions cause disease, how great the necessity is that such conditions be obviated and hygienic ones substituted!

Notwithstanding the importance of good nursing, in the rural districts it is frequently difficult to find a professional nurse, or, if one can be obtained, it is often impossible for the invalid to procure such services, on account of the expense which must necessarily be incurred. Hence, this office usually devolves upon some relative who is considered to be the best qualified for the position; or, as is often the case, necessity demands that the patient be left to a change of nurses. A woman is generally selected for this important position. Her

soft hand and soothing voice, her kindly, sympathetic, and provident nature, together with her scrupulous cleanliness, render her man's equal, if not his superior, in the capacity of nurse. There are circumstances, however, in which the services of a man are indispensable; hence the necessity that all should be qualified to care for the sick.

A nurse should be attentive to the requirements of physician and patient, for she sustains an intimate relation to both. She should observe the directions of the physician, and faithfully perform them. She should note all the symptoms of the patient, and do everything in her power to promote comfort and recovery. She should anticipate the wishes, and not cause the patient to ask for everything which is desired. So far as practicable, let the wishes be gratified. The senses of the sick often become morbidly acute, and those things which in health would pass unnoticed, in sickness are so magnified as to occasion annoyance and vexation. Sick persons are not all alike, and the peculiarities of each must be studied separately. The nurse must be *kind*, but *firm*, and not yield to such whims of the patient as may be detrimental to recovery; neither must she arouse dislike or anger by opposition, but endeavor to *win* the patient from all delusions. The feelings of the patient should never be trifled with, for idealities become realities.

The nurse should possess an inexhaustible store of patience. Disease affects the mind of the patient and fills it with strange delusions. The sick are often querulous, fretful, and unreasonable, and should be treated with kindness, forbearance, and sympathy. The nurse should always be cheerful, look on the bright side of every circumstance, animate them with encouragement, and inspire them with hope. Hope is one of the best of tonics. It stimulates the flagging, vital energies, and imparts new life to the weak and exhausted forces. Gloom, sadness, and despondency depress the vital forces and lead to death. We have seen patients rapidly sinking, who had given up all hope, and were quietly awaiting the coming of death, snatched, as it were, from its grasp, and restored to health, by words of cheer and encouragement.

The nurse should possess *moral principles*, which alone

can win the confidence of the patient. She should have judgment, circumspection, intelligence, forethought, alacrity, carefulness, and neatness. In a word she should exercise *common sense*.

We deem it but justice to say a word in behalf of the nurse. She, too, is a human being, subject to disease, and, unless hygienic conditions be observed, will soon be stricken low by its presence. She must be relieved occasionally and get rest, or she cannot long withstand the combined influence of fatigue and disease. Her office is an arduous one at best, and the long, weary hours of night-watching should be compensated by exercise in the open air, as well as by sleep during the day. Unless this be done, the system will become exhausted, and sleep will intrude itself upon her at the time when the greatest diligence is required for the welfare of the patient, when the vital powers are at their lowest ebb. She should be supplied with plenty of suitable food during the night, to sustain her and to serve as a safeguard against the invasion of disease. She should be treated with kindness and respect, else her disposition may become morose and reflect itself upon the patient, causing peevishness and despondency.

**The Sick-room** should be as comfortable, cheerful and pleasant, as circumstances will allow. Let the room be large and airy and have proper facilities for heating. All articles of clothing and furniture, not necessary to the comfort of the patient, should be removed from the room, and in *malignant* and *contagious* diseases the carpets, even, should not be permitted to remain. The surroundings beget happiness or gloom, in proportion as they are pleasant or disagreeable. A tidy attendant, a few flowers and books, wonderfully enhance the cheerfulness of the room. Permit no unnecessary accumulation of bottles, or any thing that can in any way render the room unpleasant. Medicines, drink, or nourishment should never be left uncovered in the sick-room, since they quickly absorb the gaseous emanations from the patient, and become unfit for the purpose which they were intended to serve. Their presence gives the room an untidy appearance, suggestive of filth and slovenliness, and imparts to the patient a feeling of loathing and disgust for articles of diet.

**Pure Air.** The air in the sick-room should be kept as pure as possible. That which is so necessary in health, is indispensable in sickness. The importance, therefore, of a perfect and free ventilation of the sick-room cannot be too thoroughly impressed; and yet to properly secure this end, may call forth a considerable amount of ingenuity on the part of the nurse. A window should be open, but the current of air must not be allowed to blow directly upon the patient. One window may be raised from the bottom and another lowered from the top. This will permit the entrance of pure air from without, and the exit of the vitiated air from within. The patient, if sufficiently covered in bed, is not liable to take cold from a proper ventilation of the room. Especially is this true, when the bodily temperature is raised by febrile or inflammatory affections. The *temperature* of a room is no indication of the *purity* of the air. It is a prevalent, but mistaken notion, that when a room is cold, the air must be pure. Cold air is as readily contaminated with impurities as warm air, therefore, it is not sufficient that the room be kept cool, but the air should be frequently changed. During convalescence, great care is necessary to protect the patient from taking cold. Air which is admitted into the sick-room should not be contaminated by passing over foul drains or other sources of infection, since, instead of invigorating, it depresses the physical forces and generates disease.

**Light** is as necessary to health as is pure air. Banish either for any continuous period of time, and serious results follow. The strong, robust man, when deprived of light, soon degenerates into a feeble, sickly being, and finally dies.

According to the investigations of the Massachusetts Medical Society, it was found that absence of sunlight, together with moisture, not only favor the development of tubercular consumption, but act as an exciting cause. It is well known that persons living in shaded dwellings often suffer from forms of disease which resist all treatment until proper admission of light is secured.

A physician of Russia found upon examination that patients confined in well lighted wards, were four times as liable to recover as were those in poorly lighted rooms. Children reared away from the sunlight are apt to be deformed and idiotic, while those partially deformed have been restored by being admitted to the light.

Patients sometimes wish to have their rooms darkened, because the light is painful to their weak and sensitive eyes. It is far better to shade the eyes and admit the sunlight into the room, since its rays cause chemical changes to take place, which favor the return of health. Many invalids can ascribe their recovery to the influence of a sun bath. There are, however, conditions in which the patients should be screened from the light. In such cases a little arrangement of the curtains or shutters will accomplish all that is to be desired.

Patients convalescing from acute, or suffering from chronic diseases, should receive the influence of light in the open air, and be in it several hours every day. Light and pure air stimulate a healthful development, induce cheerfulness, hope, and recovery, while darkness begets gloom, sadness, despondency, disease, and ultimately death.

**Warmth** is essential to the well-being of the patient, and it is necessary that a proper temperature be maintained in the room. Except in very warm weather, a little fire should be kept in the room, and at the same time fresh air should be admitted from without, and a uniform temperature thus preserved. This arrangement is especially necessary in localities where great variations in temperature are experienced during the day and night.

The normal temperature of the body ranges from 98° to 99° Fahr. The minimum occurs from 2 to 6 A.M.; the maximum, from 1 to 6 P.M. The deviation of a few degrees from this standard indicates disease, and the greater the deviation, the greater is its severity. During the early stages of acute diseases, the animal heat is generally increased, and should be allayed by bathing, and cooling or acidulated drinks. In the latter stages, the temperature becomes diminished and the con-

dition of the system is favorable to congestions, which are most likely to occur between the hours of 2 and 6 A. M., when the vital powers are lowest. The patient then becomes feeble, his extremities grow cold, and he has what is termed a "sinking spell," and perhaps dies. It is during these hours that additional covering, the application of hot bricks to the feet, and bottles of hot water to the limbs and body, friction upon the surface, stimulating drinks, and increased vigilance on the part of the nurse will often save the patient's life. But, unfortunately, at these hours the nurse is apt to get sleepy and inattentive, the demands of the patient go unheeded, and a sacrifice of life is the result.

Persons suffering from chronic diseases, or those in feeble health, should preserve their vital energies by dressing warmly, by wearing flannels next to the skin, and by carefully protecting the feet from cold and moisture.

**Cleanliness** cannot be too thoroughly impressed upon the minds of those who have the care of the sick. Filthiness is productive of disease and favorable to its development. Bathing at least once a day, with pure, soft water and toilet-soap, is strongly urged, and as this is designed for cleanliness, the temperature of the bath should be made agreeable to the patient.

**The Clothing and Bedding of the Patient** in acute diseases, should be changed frequently and thoroughly aired, if not washed. As soon as removed, these articles should be taken from the room, replaced by others *well aired and warmed*. The hands and face of the patient should be bathed frequently, the hair combed, the teeth brushed, the nails cleaned, the lips moistened, and everything about him kept clean and tidy. These observances, although in themselves trifling, promote comfort and cheerfulness, and contribute largely to the recovery of the sick. All excretions from the patient should be buried, and not committed to places where disease may be communicated to those who frequent them.

**The Diet** contains a very important relation to health. During the process of acute disease, the appetite is generally much impaired, if not entirely absent. It should then be the study of the nurse to devise such articles of nourishment as will be acceptable to the patient and suitable to the condition. The food should be light, nutritious, and easy of digestion,

Each individual disease requires a diet adapted to its peculiarities. Those of an inflammatory character require an unstimulating diet, as gruel, barley-water, toast, etc. An exhausted or enfeebled condition of the brain, unattended by irritability, demands a stimulating diet, as beef, eggs, fish, Graham bread, oysters, etc. In wasting diseases, in which the temperature of the system is low, beef, fatty substances, rich milk, sweet cream, and other carbonaceous articles of diet are recommended. In the various forms of chronic ailments, the diet must be varied according to the nature of the disease and the peculiarities of the patient. Deranged digestion is generally an accompaniment of chronic disease. A return to normal digestion should be encouraged by selecting appropriate articles of food, paying due regard to its quantity and quality, as well as to the manner and time of eating. The appearance of food, and the manner in which it is offered, have much to do with its acceptance, or rejection by the patient. Let the nourishment be presented in a nice, clean dish, of a size and shape appropriate to the quantity. More food than can be eaten by the patient should not be placed before him at one time, since a great quantity excites disgust and loathing. In taking nourishment, drink, or medicine, the patient, if feeble, should not be obliged to change his position.

**Milk** is one of the most important foods in fevers and acute diseases attended with great prostration, and in which the digestive powers are enfeebled. It contains within itself all the elements of nutrition.

**Beef Tea** furnishes an excellent nourishment for the sick, but there are few, even among professional nurses who know how to properly prepare it. We give three good recipes. One method is to chip up lean beef, put it in a porcelain or tin saucepan, cover it with *cold* water, and bring it up to just below the boiling point, at which temperature *retain it* for ten minutes, then season and serve. Another method is similar to the foregoing, with this difference, that the juices of the meat are squeezed through a piece of muslin or crash, making the tea richer. Another way, which we consider preferable to either of the above, is to take lean beef, cut it into fine bits, put them in a tightly covered vessel, which is placed in a kettle of water kept boiling. Thus the whole strength of the juice

will be obtained from the meat without losing any of its properties. It can be seasoned to the taste, and reduced with water to suit the needs of the patient.

**Sleep** is "Nature's grand restorer, a balm to all mankind; the best comforter of that sad heart whom fortune's spite assails." It is necessary in health, and doubly so in sickness. During sleep, the vital energies recuperate, the forces are less rapidly expended, and the strength increases. It is the great source of rest and refreshment. Often a day's rest in bed, free from the cares and anxieties of an active life, is sufficient to ward off the approach of disease. If quiet and rest are essential to recuperation in health, their necessity in diseases must be apparent. Life frequently depends on tranquility and repose, and the least noise or confusion disturbs the sufferer and diminishes the chances of recovery. Nothing annoys sick or nervous persons more than whispering and the rustling of newspapers. If conversation be necessary, let the tones be modified, but never whisper. In sickness, when the vital forces are low, the more natural rest and sleep the patient obtains, the greater is the prospect for recovery. As a rule, *a patient should never be awakened when sleeping quietly*; not even to take medicine, unless in *extreme cases*. If the patient does not sleep, the cause should be ascertained and the appropriate remedies employed; if it arise from rush of blood to the head, cooling lotions should be applied, and warmth to the feet; if, from restlessness or general irritability, a sponge bath, followed by friction should be administered; if the wakefulness is due to noise or confusion, quiet is the remedy. When these means fail, anodynes, or nervines, should be employed. Lying on the side instead of on the back should be practiced. Patients afflicted with chronic diseases, on rising, should take a cold bath, dry the surface quickly with a coarse towel, followed by friction with the hand. Great benefit may be derived by following these suggestions when the nature of the disease is not such as to forbid it.

**Exercise** and rest necessarily alternate with each other. Exercise, so necessary to health, in many forms of disease greatly contributes to recovery. It sends the sluggish blood coursing through the veins and arteries with increased force and rapidity, so that it reaches every part of the system,

supplying it with nourishment. It increases the waste of old material and creates a demand for new.

Convalescing patients, or those suffering from chronic diseases, whenever the weather will permit, should take exercise every day in the open air. This should be done with regularity. The amount of exercise must be regulated by the strength of the patient; never take so much as to produce fatigue, but, as the strength increases, the exercise may be increased proportionately. Some interesting employment, commensurate with the patient's strength, should be instituted, so that the mind may be agreeably occupied with the body.

When unable to take active exercise, the invalid, properly protected by sufficient clothing, should ride in the open air, and each day a new route should be chosen, so that a change of scenery may be observed, thus arousing new trains of thought, which will be exhilarating and prove beneficial to him.

**Sexual Influences.** During the progress of disease or convalescence, entire continence must be observed. It is then necessary that all of the vital energies should be employed in effecting a recovery from disease, without having the additional tax imposed of overcoming the debilitating effects of sexual expenditure. This holds true with regard to all diseases, and especially those of the nervous system and genito-urinary organs.

**Visiting the Sick** may be productive of good or evil results. Mental impressions made upon the sick exert a powerful influence upon the termination of the disease. The chances of recovery are in proportion to the elevation or depression of spirits. Pleasant, cheerful associations animate the patient, inspire hope, arouse the vital energies, and aid in his recovery; while disagreeable and melancholy associations beget sadness and despondency, discourage the patient, depress the vital powers, enfeeble the body, and retard recovery.

Unless persons who visit the sick can carry with them joy, hope, mirth, and animation, they had better stay away. This applies equally in acute and chronic diseases. It does not matter what a visitor may *think* with regard to the patient's recovery, *an unfavorable opinion should never find expression in the sick-room*. Life hangs upon a brittle thread, and often

that frail support is *hope*. Cheer the sick by words of encouragement, and the hold on life will be strengthened; discourage, by uttering such expressions as, "How bad you look!" "Why, how you have failed since I saw you last!" "I would have another doctor; one who knows something!" "You can't live long if you don't get help!" etc., and the tie which binds them to earth is snapped asunder. The visitor becomes a *murderer*! Let all persons be guided by this rule: *Never go into the sick-room without carrying with you a few rays of sunshine!*

If the patient is very weak the visitor may injure him by staying too long. The length of the visit should be graduated according to the strength of the invalid. Never let the sufferer be wearied by too frequent or too lengthy visits, nor by having too many visitors at once. Above all things, do not confine your visitations to Sunday. Many do this and give themselves credit for an extra amount of piety on account of it, when, if they would scrutinize their motives more carefully, they would see that it was but a contemptible resort to save time. The sick are often grossly neglected during the week only to be visited to death upon Sunday.

**The use of Tobacco and Opium.** The recovery of the sick is often delayed, sometimes entirely prevented, by the habitual use of tobacco or opium. In acute diseases, the appetite for tobacco is usually destroyed by the force of the disease, and its use is, of necessity, discontinued; but in chronic ailments, the appetite remains unchanged, and the patient continues his indulgence greatly to the aggravation of the malady.

The use of tobacco is a pernicious habit in whatever form it is introduced into the system. Its active principle, Nicotin, which is an energetic poison, exerts its specific effect on the nervous system, tending to stimulate it to an unnatural degree of activity, the final result of which is weakness, or even paralysis. The horse, under the action of whip and spur, may exhibit great spirit and rapid movements, but urge him beyond his strength with these agents, and you inflict a lasting injury. Withhold the stimulants, and the drooping head and moping pace indicate the sad reaction which has taken place. This illustrates the evils of habitually exciting the nerves by the

use of tobacco, opium, narcotic or other drugs. Under their action, the tone of the system is greatly impaired, and it responds more feebly to the influence of curative agents. Tobacco itself, when its use becomes habitual and excessive, gives rise to the most unpleasant and dangerous pathological conditions. Oppressive torpor, weakness or loss of intellect, softening of the brain, paralysis, nervous debility, dyspepsia, functional derangement of the heart, and diseases of the liver and kidneys are not uncommon consequences of the excessive employment of this plant. A sense of faintness, nausea, giddiness, dryness of the throat, tremblings, feelings of fear, disquietude, and general nervous prostration must frequently warn persons addicted to this habit that they are sapping the very foundation of health. Under the continued operation of a poison, inducing such symptoms as these, what chance is there for remedies to accomplish their specific action? With the system already thoroughly charged with an influence antagonistic to their own, and which is sure to neutralize their effect, what good can medicine do?

Dr. King says, "A patient under treatment should give up the use of tobacco, or his physician should assume no responsibility in his case, further than to do the best he can for him." In our own extensive experience in the treatment of chronic diseases, we have often found it necessary to resort to the same restriction.

The opium habit, to which allusion has also been made, is open to the same objections, and must be abandoned by all who would seek recovery.

## CHAPTER V

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### Temperature, Pulse, Respiration, Symptoms.

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The degree of heat in the body is called *Temperature*, the beat that is felt on the expansion of an artery is termed *Pulse*, and the manner in which breathing is performed is called *Respiration*. They are vital signs in sickness, and every nurse should carefully observe them. The modern way of taking temperature is by the use of a Clinical Thermometer. The usual method, as we have said in a previous chapter, is to place the thermometer under the tongue and let it remain with the lips closed for five minutes. Normal temperature is  $98\frac{3}{5}^{\circ}$  F. If it rises above normal there is fever. Sub-normal temperature, or below  $98\frac{3}{5}^{\circ}$ , falling to  $95^{\circ}$  and as low as  $94^{\circ}$ , indicates a lowered vitality and sometimes collapse. In such cases the patient may be given stimulants such as brandy, aromatic spirits of ammonia, and in extremity, hypodermic injections of strychnine to stimulate the heart. The home nurse should not resort to these injections unless so ordered by a physician, or if no other way to save the life of a patient is apparent.

In a high fever, temperature may be reduced by a cold compress on the head and a hot-water bag at the feet, the cold sponge, hot mustard foot-bath, hot packs, etc. Temperature is usually higher in the evening than in the morning, especially with the sick. In health it is not perceptible to any great degree, although it is raised, sometimes dangerously, by violent exercise, excitement, anger, excessive indulgence in alcoholic drinks and over-eating, all of which should be avoided.

In taking the temperature, the nurse often finds it impossible

to persuade a delirious patient to retain the Clinical Thermometer in the mouth, and it is often necessary to resort to other means of ascertaining it. If the axilla (armpit) is used, it should be washed and dried, the arms crossed over the breast forming a closed cavity into which the thermometer is inserted, letting it remain about ten minutes. The best method, however, for young children, infants and delirious patients is by way of the rectum. The Thermometer is oiled, inserted about two inches and held in place by the nurse for about four minutes. If diarrhoea or dysentery is present, or if the rectum contains excrement, this method should not be used. It must also be remembered that the temperature in the axilla (armpit) is one degree *lower* than in the mouth, and one degree *higher* in the rectum. The Clinical Thermometer must be scrupulously clean and kept in an antiseptic solution. The rectal thermometer should be separate from one used in the mouth.

Perhaps the most significant indication of a patient's physical condition is the *pulse*, which is the beat produced by the contraction of the left cavity of the heart causing an expansion of the artery. The state of the circulation is ascertained by the pulse beats, which are felt by placing the fingers over the artery and counting the number of beats in a minute. Some people are nervous and apprehensive, which accelerates the beating. Such patients should be soothed and diverted. About 72 firm and steady beats to a minute indicate a normal pulse.

There is a great deal of talk in these days about *arteriosclerosis*, which with some persons amounts to a fad; they think of it, and dwell on it too much. Arteriosclerosis is a degeneration or hardening of the arteries which sometimes produces premature old age, and which exists to a greater or lesser extent normally in aged persons. The saying, "A man is as old as his arteries," is often heard. One way to keep young is to *think you are young*. Many individuals at seventy are younger, that is, their arteries are in better condition, than others at forty or fifty who have abused their systems, especially by the excessive use of alcoholic drinks, which hardens the arteries prematurely. In some maladies, however, notably Bright's Disease, Syphilis and Lead Poisoning, hardening of the arteries (arteriosclerosis) frequently occurs.

The condition of the arteries is determined by taking the *blood pressure* and is resorted to in all cases where a thorough diagnosis is to be made. The greater the degeneration, the less elasticity

and the higher the pressure. In a healthy adult the blood pressure should be from 120 to 140, increasing with age as a rule, but relatively lower in children. In some diseases it has been known to be as high as 200 or 300, and the patient suffers from difficult breathing, dizziness, and other distressing symptoms.

Observing the quality of the pulse is important and the experienced nurse knows just how to determine the rhythm, volume, tension and force. The inexperienced nurse must study all these symptoms, and if a patient's pulse lacks regularity and is intermittent (skipping beats) or if the beats are weak and indistinct, she should report at once to the physician. The pulse in which each beat is even, strong and firm is a *normal* pulse. It is *abnormal* when it is the reverse, irregularity often indicating heart disease, yet not always, as it may be caused by indigestion, nervousness and pressure of an enlarged spleen.

An equally important sign to be studied and observed is *Respiration*, which is determined by counting the number of breaths taken per minute, which, when normal, are computed thus:

- 16 to 18 in the male adult,
- 18 to 20 in the female adult,
- 20 to 25 in young children,
- 30 to 35 in infants.

The significance of close and intelligent observation of the patient's *symptoms*,—one of the essential qualities in a successful nurse—is evident when we consider that she has greater opportunity of observation than the physician. The patient usually rallies and brightens up when the doctor comes, especially if he is one who inspires hope. The nurse sees the patient in hours of pain and depression, in the night when fever is apt to be higher and at the critical time if the patient is seriously ill. The general appearance, the color of the lips, the expression of the eyes, the condition of the tongue, etc., must all be observed and reported.

Symptoms are entitled, *subjective* (mental) and *objective* (external). In the former the patient describes them, indicating where the pain or distress is located; the latter are symptoms which are apparent to the nurse. In listening to a patient's description of sensations, she should remember the exact words when she makes her report, but with young children, or unconscious or delirious

patients, there should be an examination of the physical signs in order to diagnose the case.

It is not difficult for a nurse whose powers of observation are trained, to note and comprehend the general signs of bodily distress and locate them. She should observe the condition of the body, the condition and color of the skin, the patient's bodily strength, if there are any abnormal swellings or puffiness around the feet or ankles, enlargements of the joints, indications of tumor, or sore spots; also if the feet and hands are cold, the patient's mental condition, the condition of the eyes, nose, mouth and teeth and other symptoms. Chills are usually important signs and their duration and severity must be observed. When the chill is over, the temperature should be taken, which, if above  $100^{\circ}$ , may be serious. If not much above normal, the chill may have been due to nervousness. The patient should be immediately covered with warm blankets and surrounded with hot-water bags or hot bricks which should first be well protected by wrapping in flannel cloths to prevent burning. Hot drinks should then be given to promote a free perspiration. It is good practice to give a dose of castor oil, or Dr. Pierce's Pleasant Pellets, at such a time so as to evacuate the bowels and eliminate poisons from the system. When the chill is over, if the patient has perspired freely, he must be dried under the blanket and given an alcohol rub. Symptoms which should be observed and reported are numbness of certain parts of the body, nausea, faintness and dizziness. The nurse should ascertain whether the patient's sleep is restless or quiet and its duration, and in case of pain, whether it is acute or dull, beside many other symptoms which naturally come under the observation of a capable nurse and which is an important part of her professional education.

The position of a patient in bed may assist in determining his condition. If the knees are drawn up there may be abdominal trouble. If there is heart trouble it is uncomfortable to lie flat or on the left side. In tuberculosis of one lung the patient is more comfortable upon the sound side, while in pleurisy the side in which the pain is located, is preferred. If there is a dull pain and the head draws back, there may be spinal and brain disease. When the patient constantly jerks or twitches, has hiccough, picks at the bed clothes and is very restless, it is serious and must be reported at once. The nurse should note any skin trouble or rash which may

be due to many causes—to the effect of drugs, to contagious diseases, to clothing.

Any person who administers medicines should understand the technical meaning of weights and measures. A measuring-glass should be found in every family medicine-chest. The use of cups or spoons is not advised as the measurements in the glass are exact and correspond to the apothecaries' measure. Another system of measurement which originated in France and is now in general use in Europe, and largely in the Medical Department of the United States Army, is the Metric System. The knowledge of measurements is an essential part of the education of a nurse.

Statistics prove that many lamentable mistakes have been made in giving medicine carelessly and the nurse will do well to remember the old rule,—“Read the label on the box or bottle three times: First, on taking it from its place; second, before pouring the medicine, counting the pills or tablets, or measuring the powder; third, on replacing the box or bottle.” There should be no mistakes if every nurse followed these simple rules, realizing her grave responsibility.

The nurse should make a careful study of drugs and their uses, and the action of the medicines she gives; the physician should always direct their use, of course, but conditions sometimes arise when the responsibility rests on the nurse, and she should be prepared to meet it. All this cannot be learned easily, but knowledge will come with experience combined with intelligent observation.

## CHAPTER VI

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### EXTERNAL APPLICATIONS AND ENEMAS

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**The Hot-Water Bag, Soapstones, the Hot Compress,  
Bran Bag, Cotton Jacket, Poultices, Plasters,  
Leeches, Counter-irritants,  
Enemas, etc.**

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Pain is always an indication of inflammation or congestion; it is the cry for relief, the danger signal, and a nurse should never disregard its warning. Inflammation usually has several unmistakable symptoms, such as heat, redness, swelling or pain which may be the result of internal congestion, an injury to the tissues caused by fracture, a burn, an abscess, or a boil, etc.

The usual method of relieving pain is by dry heat applied by a hot-water bag. When it is not at hand there are substitutes such as flat-irons heated and wrapped in flannel, bags of salt heated, hot bricks and soapstones; these were all used long before rubber hot-water bags were known. There are soapstones in old families which are veritable heirlooms and have given soothing relief from one generation to another and are still in evidence. The hot-water bag is so universally used and *misused*, that though it is simple enough to handle, it is often the cause of scalding or burning, first by bursting, second by prolonged contact with a

helpless patient. The rules for its use which only require attention and care on the part of the nurse, are, the bag should never be more than two-thirds full—half is better—(Fig. 1) and the water should not be hot enough to scald the patient if a leak in the rubber occurs. Great care should be taken in applying the hot-water bag to unconscious patients. The nurse should be sure that the bag has a cover and is kept in position and that it is not left long enough to burn the flesh. Instances have been known where patients have had to remain in a hospital for some time after recovery from an operation because of a deep burn caused by the careless filling and handling of hot-water bags. In conditions of lowered vitality and for the relief of pain, the hot-water bag is much used; also for distress caused by retention of urine. In using the rubber bag care should be taken that all air is pressed out before screwing on the stopper in order that it may lie flat, and it should be remembered that glass hot-water bottles should never be more than two-thirds full.



Filling the Hot-Water Bag.

Another way of relieving pain is by the Hot Compress which is made by wringing out folds of flannel in very hot water. The proper method is to place the folded flannel in a towel over a basin, pour the hot water over it and wring by twisting the ends of the towel. (Fig. 2.) This is called a *fomentation*, and after it is unrolled and folded to the size required and the heat tested, by the nurse putting the back of her hand on it, the compress is applied to the exposed part indicated, as hot as is endurable to the patient. Then it is carefully covered with some waterproof material with a bath towel over it to prevent dripping. It may be kept hot for two or three hours if a hot-water bag half filled is placed over it. The nurse should be the judge as to the length of time and of the sensitiveness of the

(Fig. 2.)



Preparing Hot Compress

patient's skin. Some person being much more sensitive than others, burn easier. Fomentations should not be applied to patients who are very weak, unconscious or paralyzed.

In preparing a Mustard poultice, use about three-fourths of dry flour to one-fourth of ground mustard with warm water as a liquid. Stir in until a smooth paste *without lumps* is made. When the paste is ready, spread on gauze or thin linen, placing one thickness over the paste. Apply and leave on until the skin is red, being careful not to let it remain long enough to blister. And, after removing, rub the reddened part gently with vaseline or oil, after sponging with warm (not hot) water, and drying.

The Flaxseed (or linseed) poultice has been used always, or as far back as we can remember, and it has properties which retain heat a long while, but should be watched and changed often, because if through inattention it is allowed to get cold, it does harm. In making this poultice, have sufficient water boiling in a saucepan and stir in slowly, the flaxseed (or linseed) meal, being careful not to have lumps. When it is well cooked and smooth, spread on a large cloth of thin muslin, or two thicknesses of gauze, about two inches thick. Fold up the edges, roll in a towel, take to the patient and apply as hot as it can be borne, being careful to test the heat. The nurse should be careful to obey orders as to the length of time the poultice should be kept on the patient.

As a counterirritant, Tincture of Iodine is useful, and is painted on the skin with a small brush or with a little absorbent cotton twisted on a wooden toothpick or match.

There are small rubber bags that may be half-filled with hot water and applied to the cheek in case of toothache. Small flannel bags filled with bran or salt also retain heat a long time, and are useful in neuralgia in the face or earache. It is a good plan for a home nurse to have several of these little flannel bags, as they can be emptied and washed.

As every one knows, the Thermos Bottle is a great convenience, because when either hot or cold liquid is put into it, it retains the heat or cold for hours. They are much used by those who make long automobile trips. There is an invention along the same lines known as "The Thermostat," which is a rubber bag chemically treated so that heat is produced when it is lightly rubbed and these bags are said to retain heat a much longer time than those

filled with hot water. Cotton Jackets, which retain the heat for a long time, may be made for the patient's chest. To make such a Jacket, take a pound roll of absorbent cotton, warm it and spread it evenly over the patient's chest and back so that they are evenly covered (the patient in a sitting position). A layer of cotton or wool flannel cut to fit the neck and reaching from the neck to the lower ribs is sewed over the absorbent cotton, and must be left on until the need for it is past. Another way to make a Pneumonia Jacket is to spread the cotton between two layers of thin muslin lightly quilted and fitted to the body like a waist, one shoulder left open and fastened by narrow bands over the shoulder and under the arm.

A bread poultice is much used in homes to draw a splinter from a finger and is an old-fashioned application for boils, but is rather dangerous as when they "break" the poison is apt to be spread and another boil start.

The *Cold Compress* is used to relieve fever, delirium and pain, and is applied to the forehead when sweat baths are taken. As we have remarked in a previous chapter, the rule is that when heat is applied to the feet, cold should be applied to the head. This should always be kept in mind as it prevents a rush of blood to the head. A cold compress is made by wringing out a cloth in ice water and binding it in place around the head, well covered. This soon gets warm and the easier and more practical way is to wring out a cloth of Turkish toweling in cold water, place on the forehead and change frequently. Ice-bags of the required size are also used, especially in fever cases. These are small rubber bags, half-filled with crushed ice which the nurse may prepare by putting pieces of ice in a strong cloth and pounding it with a hammer, or in any way her intelligence suggests. On applying the icebag to any part of the body a light towel is placed between the skin and the bag.

Ironing the region in which the pain is located, especially in lumbago or muscular rheumatism is not practised in hospitals, but has long been a popular remedy in home nursing, and it is believed that the pressure combined with heat affords relief. The flat-iron is heated, wrapped in flannel and passed to and fro over the painful place until the sufferer cries "enough!" However, this method is of doubtful value.

Fluid sometimes gathers between the joints or in the knees (synovitis is not unusual) and also around the heart (pericarditis with effusion). These are serious conditions if not attended to. In pleurisy when the physician suspects the formation of purulent fluid (empyema), it is necessary to draw it off by tapping the cavity, and when a large opening is necessary the cavity is drained with rubber tubes. In ordinary cases of pleurisy *counter-irritation* is resorted to for absorbing and checking the formation and relieving pain. In administering all poultices, plasters or blisters, a careful cleansing of the skin is important, and before applying a blister a mild disinfectant should be used in order to have the skin antiseptic when the blister is opened. A nurse should apply all blisters under instructions if possible, and should give careful attention to details.

The blister commonly used is prepared of Spanish Fly (cantharides). Like Iodine, the Cantharidal Collodion Blister is applied with a soft camel's hair brush, keeping within the inflamed area and not allowing it to spread beyond. After it is dry cover with a thin linen cloth or gauze, keeping it in place with a light bandage. The time usually given for such a blister is from four to eight hours. The irritant having been removed, a poultice may be applied, or sweet oil may be applied and covered with sterilized gauze.

Croton Oil is a powerful blister usually applied to the chest, but should never be used inadvisedly, as it often is in homes. Instances have been known in which a very sore and inflamed chest was the result.

A good liniment is often efficacious in relieving sore joints, as the knees; rubbing should be with a long upward stroke, using the flat hand. Suggestion aids, and the magnetism of the person combined with the thought that the rubbing is strengthening and relieving, doubles its efficacy. Such is the power of mind over matter!

The Belladonna Plaster is used for lumbago and muscular pain. It is warmed and applied to the painful part and carefully smoothed out to prevent wrinkles.

The Capsicum Plaster is used by those who like to doctor them-

selves and it affords heat to the painful part, and is a counter-irritant. The opium plaster is soothing but is not in general use. A plaster of ammonia and mercury is sometimes applied to introduce mercury into the system.

Removing a plaster is often a painful process. If it adheres too much it can be removed by dissolving the adhesive substance with turpentine or ether. Sweet oil is better to remove capsicum and mustard plasters, as turpentine may blister.

The Leech, a blood-sucking worm, has been used to draw blood and in olden times doctors were sometimes called "Leeches"! The leeches were kept in a wide-mouthed bottle of fresh water when not in use. The leech will refuse to bite if there is any strong odor from scented soap.

A popular treatment for snake bites, or the bite of any animal or poisonous insect, is cauterization. It has always been used, but modern surgeons prefer free incision; however, in an emergency, it has its advantages. Every hunter or woodsman, where poisonous snakes abound, knows how to cauterize (or burn) the flesh and to apply a tourniquet to stop bleeding, (illustrated page 65) and any intelligent person should know what to do to save life in these emergencies, when medical aid is not procurable. The Paquelin Cautery is generally used in hospitals, the nurse assisting the surgeon.

In hospitals, military or otherwise, *Enemas* are usually given to the men by an orderly; but if he is not at hand the nurse must attend to it. She must be ready always to face disagreeable duties cheerfully, as "all in the day's work." The purpose of an enema (rectal injection) is to unload the lower bowel. About three pints of water is used in a rubber bag to which is attached either a soft rubber rectal tube, or a short hard rubber rectal tube. The rubber cone-shaped rectal tube, with the opening on the side, is considered the best, but usually for simple injection the hard rubber nozzle attached to the fountain syringe is used. A small rubber sheet should be placed under the patient's thighs whether in the hospital or home, to prevent wetting the bed; or, a large Turkish bath towel may be used to absorb the moisture. In giving an enema, in order to prevent air entering the bowel, which often causes pain and distention, the tube must first be filled with

fluid and clamped so that the fluid cannot escape while the tube is being inserted; then turn the patient on the left side with the knees bent so that the muscles of the abdomen are relaxed. When the patient is in position the water or solution having been allowed to run off into the bedpan or commode which is near at hand, until warm enough, the tube is greased and inserted about six inches into the rectum, if rectal tube is used; this is called a *low enema*; the *high enema* reaches as far up the colon as possible and the tube must be passed (with great care) beyond the sigmoid flexure at least eight inches. The nurse must not push the tube too hard, for only by gentle and skillful handling can this delicate process be successfully accomplished. If the patient is not bed-ridden, the knee and elbow position is convenient and effectual. This requires getting down on both knees and elbows, raising the hips and lowering the shoulders. The bowel is quickly filled if the douche bag is sufficiently elevated, and it is possible to irrigate higher than in the side-lying posture. The nurse should also know the proper temperature for different kinds of enemas. The inexperienced nurse cannot expect to remember all the variations, even though she has studied them. Knowledge comes with experience, and if enemas are given to patients who are very ill, the physician or head nurse must be consulted. It is unquestionably better to consult the attending physician and follow his directions when the case seems to require the use of the douche.

For a simple enema the procedure is, after the patient is in position and the tube inserted into the rectum, the "shut-off" is released and a solution of soapy water allowed to run into the bowel until a sufficient quantity has been taken in. An enema must not be given too rapidly as is apt to be done by careless or inexperienced nurses. It often causes distress and the patient expels the solution too soon. In some cases the rectum is clogged with a hard dry substance, and it is imperative this should be removed for often it is a dangerous condition. When it becomes a real necessity to remove it, the nurse attends to it by inserting the finger protected by a rubber finger-stall or glove well oiled. It is obvious for several reasons that the finger should never be inserted unless so protected.

Pure soap should always be used in preparing a soap-suds enema. Laundry soaps contain ingredients which may irritate the mucous membrane. This is the most commonly used enema to move the

bowels, the water being warm and the quantity from 3 to 4 pints.

The Salt Solution cleanses the lower bowel and is often the means of bringing the patient up to normal, after a collapse, by raising the blood pressure. It is given warm, with the temperature of the solution as high as 120° F.

The Nutritive Enema is a method of feeding, used when the patient cannot retain even liquid food in the stomach, in cases of ulcers or cancers, and in stricture of the esophagus. As the large intestine absorbs, but does not digest, the liquid food is peptonized unless already prepared for absorption. Milk is largely used, often combined with white of egg, beef extract and salt. Before giving the Nutritive Enema, a simple enema is given to cleanse the bowel.

The Glycerine and the Oil Enemas are beneficial in some cases, and the Gelatin Enema is resorted to for hemorrhage of the stomach and intestines. There are instances when it was impossible to reach the seat of trouble in any other way, and the injection of gelatin dissolved in hot water has stopped bleeding, and saved life. The Starch Enema is given to check diarrhoea and the Carminative Enema to relieve distention and flatulency. There are the Asafœtida Enema and the Turpentine Enema, which latter is made by adding a scant half ounce of turpentine to a pint of soap-suds solution, after giving this a pint or a little more of the clear soap-suds should be administered.

Sedatives are also given in enemas, such as chloral, bromides, etc. The quantity of warm water or milk used should be about three ounces, the drug dissolved in one half, the other half given immediately after. The bed pan should be warmed before using. When a patient is very weak he will have to be helped in using it, but many men are able to help themselves and are usually glad to do so.

## CHAPTER VII

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### SURGICAL DRESSINGS

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Well-equipped hospitals have on hand all the most approved materials for dressing wounds; but this is not often so in private houses, and rarely does a nurse or surgeon when called to attend an emergency case find the necessary articles in a home. There should be, carefully protected from dust, pads of absorbent cotton, soft sponges, gauze dressing, safety pins and dressing scissors. Any surgeon called to dress a wound or burn outside of a hospital is usually provided with all instruments and dressings necessary; but there have been instances when such a provision was of great value, and it is best to be on the safe side. A well-equipped emergency room for dressing wounds is now to be found in all large hospitals where the patient is treated, but this is not so in homes, and the nurse, besides the above-mentioned articles, must provide a bowl of antiseptic solution for the hands, and another bowl of the same to use in washing the wound or to moisten the dressing if it adheres. The instruments used must be boiled ten or twelve minutes, and a receptacle ready to receive the soiled dressings. If a cut, or incision, is to be made, there should also be at hand a surgical needle, two artery forceps, sharp scissors, a knife, catgut ligature, and a suture of silk or silkworm gut, and if it is necessary to open an abscess, a tube of gauze packing and drainage tubing. These may not all be required, and the nurse should ascertain what is really necessary.

The first essential to modern surgery is cleanliness. The dressings and instruments must be sterilized to be rendered free from germs, and whether in a home or in a hospital no dust or dirt can be tolerated. In a private home all the conveniences to be found in a well-equipped hospital cannot be expected, but if an operation

is to be done it must be in a well-lighted and well-ventilated room, if possible; however, as a rule, only minor cases are attended to in private houses today, as almost every one goes to a hospital for treatment, the dread of such places no longer remaining.

One of the most important requisites for a nurse is to have the hands absolutely clean. Before applying a surgical dressing or assisting the medical man, the hands should be scrubbed with a hand-brush with soap and hot water and rinsed in clean water. The finger nails should be kept short and thoroughly cleaned. Then the hands should be immersed in an antiseptic solution and afterwards washed in water with a little ammonia in it to do away with the odor of the disinfectant.

If a physician is not at hand and it is necessary for the nurse to attend to the dressings, she should remember the methods of the surgeon in previous dressings and carefully follow them. In this as in everything connected with nursing, intelligence and quick, gentle handling count. As we have said, the hands must be scrupulously clean and sterile. Remember that there must be no carelessness, strict attention to technique should be kept. Surgical technique, so called, demands that unsterile objects must be handled by persons who do not come in contact with the open wound, and that the person and clothing of the assistants at an operation or dressing should be sterile—that is, absolutely clean.

For surgical dressings the material generally used is bleached gauze, and there are sterilized gauze sponges, and different sizes of gauze dressings that are ready for use, and packages of gauze medicated with various antiseptic preparations, but the one most used is iodoform gauze. When none of these can be obtained, any thin, smooth absorbent cloth may be used after it has been boiled, to render it sterile; old linen is preferable, soaked in an antiseptic. To keep in place dressings which cannot be bandaged successfully, narrow strips of adhesive plaster are used to pull the edges of the wound together, and also to support some kinds of fracture, to absorb swollen joints by pressure, and to hold a dressing on the face. The removal of the strips of plaster is less painful if done quickly, beginning at both ends and pulling toward the middle. Oiled silk and oiled muslin are useful as a protection placed over a gauze dressing, especially when there is much discharge, or to retain heat when a hot dressing is applied.

A comparatively new substance, called Ambrine, has of late

come into favor for treating burns. One of its absolute requirements is that the directions for applying it be carefully followed. The burned surface should be cleansed by the very gentle application of a soft wet linen cloth, then dried, preferably by warm air, before spraying or painting the Ambrine on to the burn as warm as can be borne. Then a thin layer of absorbent cotton is placed over it, and Ambrine sprayed over it, and after applying a thick wad of absorbent cotton it is bandaged in place. The dressing is peeled off each day, and renewed, taking great pains not to remove dead skin, etc., unless it comes off easily.

Iodine came into general use as applied to wounds when the United States troops were in active service on the Mexican border. The climate, the uncleanness and the unfavorable sanitary surroundings increased the danger of infection, and it was found that iodine had the property of destroying all forms of bacilli.

The distinguished French surgeon, Dr. Delorme, General Medical Inspector of the French army, speaking of dressing wounds, says: "When we wish to disinfect the circumference of the wound with iodine (an excellent plan, and one which is held in high esteem in the surgical practice of all armies) in treating a wounded man, the dressing must be directly applied to the skin, the clothes having been unstitched or cut open so as to expose the wound and the surrounding parts. Whoever dresses the wound should first carefully disinfect the hands, washing them with soap and very hot water, then immersing them in strong grain or wood alcohol."

Dr. Delorme further says, "The application should be made dry without previously cleansing with soap, water, alcohol or ether, etc. One single coating of iodine will suffice. More than one layer would be useless, even injurious. Friction of any kind must be avoided. For the cheeks, the eyes, the genital organs, or open wounds, diluted tincture of iodine, not stronger than a tablespoonful in a pint of hot water, should be employed. Accidents brought about occasionally by using tincture of iodine are chiefly due to the applications having been made over too extensive a surface, to friction, or to antiseptic reaction, and also to stale iodine from which the alcohol has evaporated and it has become too strong. Of such a tincture use less or dilute with alcohol to its former strength before using. The medical staff of the army is now provided with unalterable iodine."

Dr. Delorme (in 1915) says: "Tincture of Iodine is at present the best and safest disinfectant to make use of in the practice of war-surgery both on the fighting line and in the rear."

Evolution and progression is the primal law of the Universe, new methods supersede the old, and we now (in 1918) find another disinfectant for the treatment of infections and infected wounds, which is strongly advocated, and of which favorable reports have been received. It is Hypochlorite of Lime.

In the "Military Surgeon," published by the Army Medical Museum, Washington, D. C., we find that in some hospitals in France, near the firing line, eminent men like Carrel, Detelly and Depage, were using a uniform technique which consisted in operating at the earliest possible opportunity, and of the aseptic removal of all foreign bodies and dead tissues. This was followed by a chemical sterilization of the wound with Dakin's Hypochlorite solution. Since the battle of the Somme, comprehensive reports have been published of numerous antiseptic agents, but

*Fig. 1.*

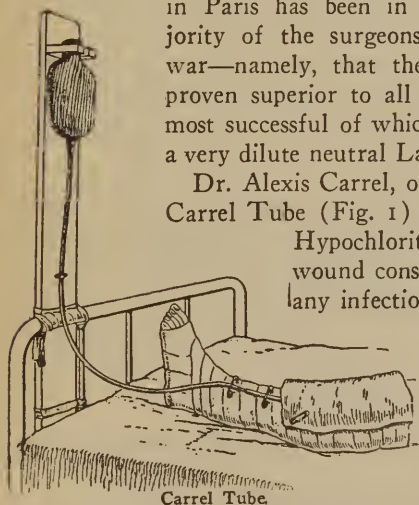
the experience of the surgeons for nearly three years at the hospital of the American Ambulance in Paris has been in accord with that of a majority of the surgeons who served in the world war—namely, that the chlorine preparations have proven superior to all other germicidal agents, the most successful of which was that of Carrel-Dakin, a very dilute neutral Labarraque's solution.

Dr. Alexis Carrel, of France, the inventor of the Carrel Tube (Fig. 1) advocates the use of Dakin's

Hypochlorite solution and keeping a wound constantly wet with it if there is any infection and if the wound is clean, closing as soon as possible. The Carrel Tube irrigates the wound.

For emergency cases in home nursing, however, iodine should be kept in the family medicine chest,

and will answer most purposes.



Carrel Tube.

## CHAPTER VIII

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### FIRST AID

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#### EMERGENCIES.

A physician should be called upon in all cases of injury or serious emergency or disease where possible.

These suggestions are intended to be helpful in emergency or where skilled service cannot be promptly secured.

Often lives are lost or in danger where a doctor cannot be had promptly.

Every person should be familiar with the simple methods that are herein described, as it may save one's self or a dear one much pain, or even life.

Keep cool, control yourself and others, so as to give most effective help.

#### SHOCK, COLLAPSE, FAINTING.

The patient may be unconscious or the mind may wander—body cold.

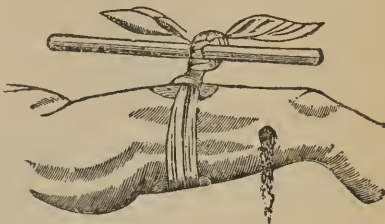
Face white, pinched, anxious, eyes dull, pupils dilated.

The heart acts rapidly, a weak pulse, shivering, faintness.

The *danger* is death from heart failure.

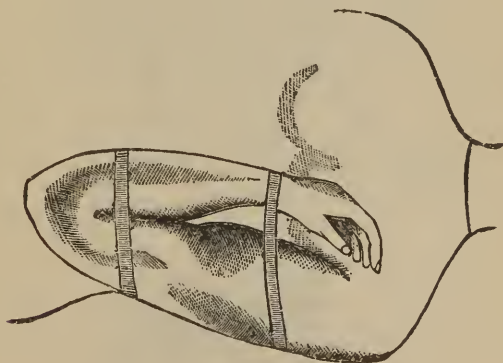
SEVERE BLEEDING is one of the common causes of shock and should be first controlled; if from the womb, pack the vagina with a tampon or gauze bandage roll pressed well up against the mouth of the womb.

If from a wound apply a tourniquet, which consists of a pad to go on the artery with a handkerchief, towel or strip of firm cloth to hold it in place. This is put loosely around the limb, and a stick inserted and used to twist the cloth until it is tight and the bleeding stops.



The Field Tourniquet as applied.

Until this can be applied, the bleeding should be stopped by firm pressure with the thumbs or fingers.



Mode of employing flexion for the arrest of hemorrhage from a wound located below the elbow.

BLEEDING from an *artery* is bright red, comes in spurts, and is most dangerous, that from a *vein* is steady and of a



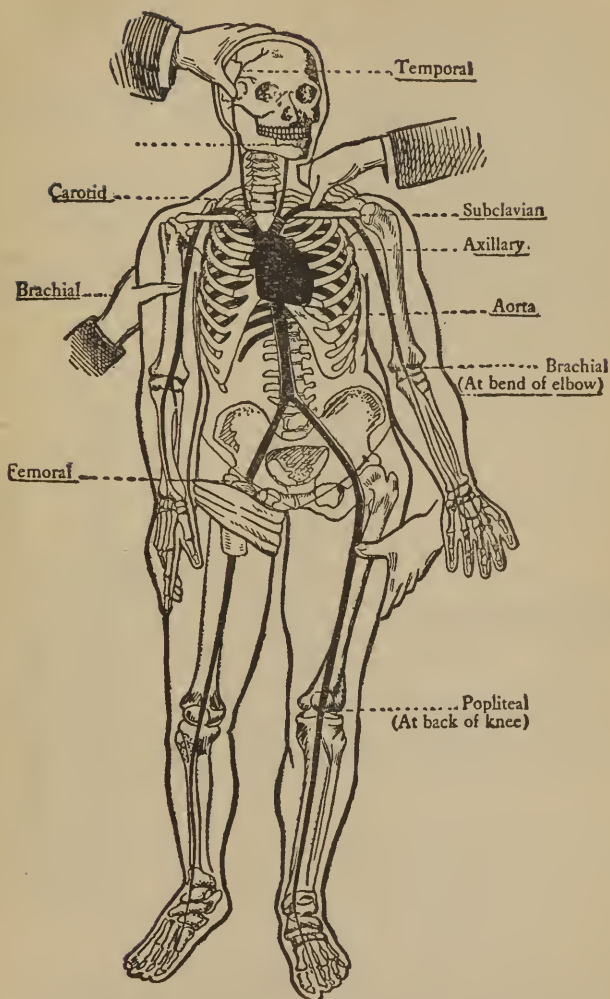
Bleeding from an *artery* is aided by pressure.

dark blue color, while capillary hemorrhage is a brick red oozing not easily controlled by pressure.



Bleeding from a *capillary*.

A clot of fibrin will usually form in a blood vessel and naturally stop a hemorrhage in about twenty minutes, if aided by pressure.



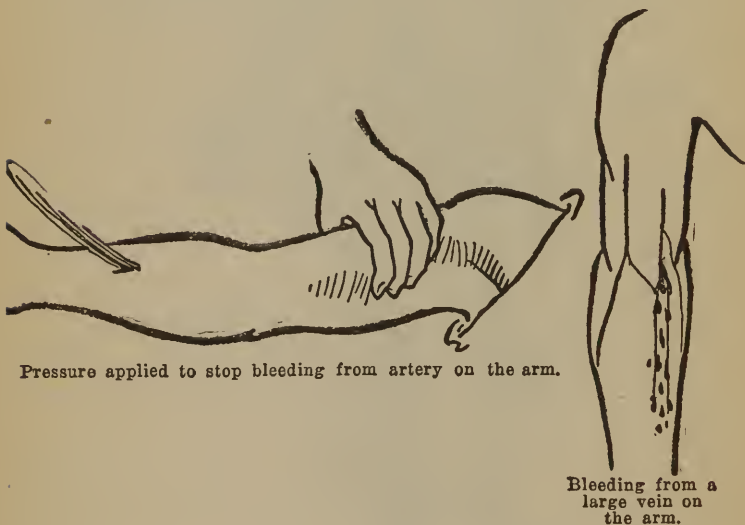
The arteries in black to indicate where pressure should be applied to check bleeding.

## CUTS AND WOUNDS.

If there is a spurt of blood, apply pressure with the finger, thumb or palm, as the size of the wound may make it necessary.

Look at the diagram on page 67 showing the location of the arteries and apply pressure to them, or a tourniquet, and then properly dress the wound.

Dirt and foreign bodies should be removed with hot water, and if it can be had, Tincture of Iodine may be applied in a strength of about fifteen drops in two table-spoonfuls of water, or a like amount of spirits of camphor, alcohol, or twice as much whiskey.



Dress with a clean pad of cloth, and surround with a suitable bandage as described on the pages that follow.

If there is **shock or faintness**, follow the directions given under that heading.



Pressure on artery applied behind the knee  
to stop bleeding from the leg.

**Treatment**—Place patient on back, with head low, so that the blood can easily enter the brain. Loosen the clothing.

Warm the body with hot bricks, or hot water bottles, with flannels wrung out of hot water to chest and stomach, and stimulate the circulation by brisk rubbing under blankets, or other covering—rub toward the body.

Give plenty of good fresh air by fanning—ammonia water on the fan will help.

Stimulants may be given.

Swallowing is difficult, and patient may strangle. Give only a few drops at first.

If patient can swallow stimulants may be given; such as (a) hot coffee or tea, (b) a tablespoonful of whiskey in hot water, (c) twenty drops of ammonia—the best form being the aromatic spirits in hot water—or (d) ten drops of spirits of camphor.

These may be given by injection into the lower bowel if the patient cannot swallow.



Pressure applied high up in the front  
and centre of the thigh for wound  
of femoral artery.

## SUFFOCATION.

When the sufferer is a child, strangled by whooping cough, or a foreign body, clear the throat with a cloth by pulling the tongue forward and wiping anything out; then the sufferer may be held up by the feet, head downwards. This tends to favor the expulsion of a foreign body or fluid, and to open the glottis.

Pressure is applied to the short ribs, relax the pressure so that the air may enter the lungs, count four slowly, thus giving four seconds interval; repeat steadily.

Sometimes a smart slap on the back will dislodge a foreign body.

If natural breathing does not soon recur, resort to the Schaefer method as follows:

### ARTIFICIAL RESPIRATION

for suffocation due to drowning, or other causes, such as breathing of poisonous gases.

Lay the patient flat, slightly on one side, **back uppermost**, pull the arm underneath upward and bend it, so that it will lay under the forehead.



**The face** must be placed to one side so that the air will not be blocked from entering the nose and mouth, sometimes it is wise to pull the tongue forward to let any water or mucus drain out.

Kneel at one side or astride the body, but do not rest any weight upon the subject.

Place the hands on each side of the chest low down across the short ribs, the thumb-tips about a finger's length apart, the palms and fingers extending around the ribs.



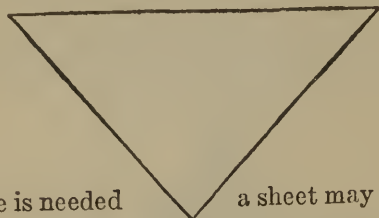
Press down with sufficient weight to expel the air from the lungs.

Release the pressure and the air will rush into the lungs—count four seconds, slowly, and repeat the process regularly.

Persons have been thus revived even when it has been necessary to keep up this artificial respiration for an hour and a half. Patience and perseverance are required.

## BANDAGES.

The TRIANGULAR BANDAGE is one of the most valuable. Two can be made from a piece of cloth about a yard square cut diagonally across from the most distant corners.



If a larger size is needed

a sheet may be cut likewise.

Method of applying TRIANGULAR BANDAGE for dressing of a wound or burn of the hand.



First step.



Second stage.



Third stage.



Final tie at wrist.

Folded of such width as may be necessary it makes a Cravat



For the neck.



Applied to the jaw.



Method of application for injury of the eye, forehead or side of face.



Applied to hold compress upon the eye.

Method of applying the TRIANGULAR BANDAGE in Cravat roll for a wound of the palm or the back of the hand.





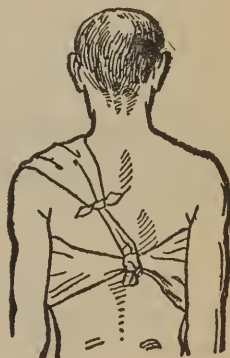
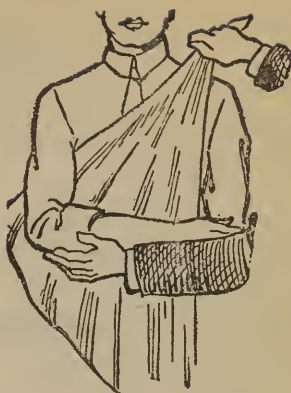
Method of applying for a dressing of the scalp.



TRIANGULAR BANDAGE applied to the foot and ankle.

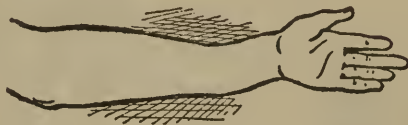


TRIANGULAR BANDAGE applied as a sling or as a supporting dressing for the forearm.



## A BROKEN FOREARM.

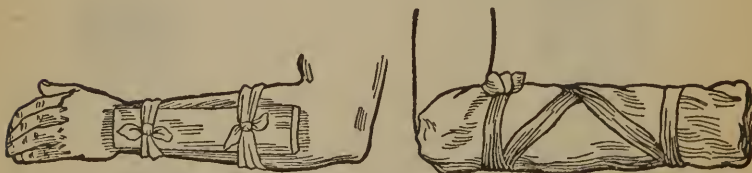
The appearance usually shows by the deformity where the bones are fractured.



Sometimes the broken bones have cut through the skin.



Straighten the broken bones by gently drawing them into place and apply a splint well padded with cotton or clean cloths.



The usual method is to cleanse the surface with hot water and apply a temporary dressing until a physician's care can be had.

A TRIANGULAR BANDAGE may then be applied as illus-



trated or if not to be had the sleeve may be pinned to the



shirt or waist front as shown in these diagrams.

## A BROKEN UPPER ARM.

Where this is present the arm should be supported with a well padded splint applied between the shoulder and



elbow, then apply a TRIANGULAR BANDAGE as a sling to hold the weight of the lower arm and hand from dragging upon the broken bones. This dressing will give support and reasonable comfort until a competent surgeon can be had. In all fractures to prevent deformity skilful care should be speedily obtained.

## A BROKEN COLLAR-BONE.

Where this is present a depression on the bone can be felt with the fingers. Unable to raise arm. Treat shock and dress as follows until surgeon can be had:

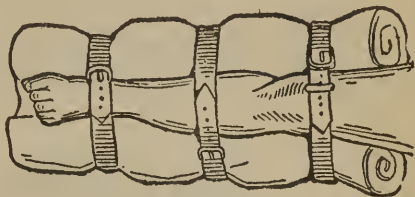
Place a soft pad a little over a half inch in thickness in the arm pit, bend the elbows so that the forearm and hand will rest across the upper part of waist and hold in place with a sling as illustrated.



## A BROKEN LEG.

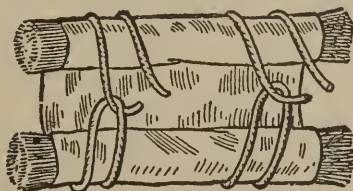
Roll up a blanket so as to make a trough in which the leg can be gently placed. Applying one palm above and the other below the break—underneath the leg, lift gently and have support drawn under the fracture. A pillow may be used.

The toes and foot should be held in the same general position as on the uninjured leg—not turned outward nor inward.



If patient must be moved get two splints one for each side of the leg. They must reach from above the knee to the heel. Thin light boards will answer.

They must be applied outside the pillow or blanket-roll and held in place by several bandages or straps.



None of these supporting straps should pass over the point of fracture or pain will be severe. In case of emergency a cane or an umbrella may be used for the outer splint and the other leg used for the inner splint. All held comfortably in place by bandages and padding.

## FRACTURED THIGH.

The patient cannot stand but usually the thick muscles prevent detection of the fracture.

A long splint or thin board must be used for the emergency treatment of this dangerous fracture. It must reach from the arm pit to the heel; fix in place with not less than seven encircling strips that should be applied to the chest as well as to the well padded limb.



An inner strip from the crotch to the foot is helpful but if not to be had tie the thighs and legs together. Pneumonia is a common after complication. Keep patient warm and speedily secure expert attendance.

## CHAPTER IX

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### BURNS AND SCALDS. Sunburn.

Never drag the clothing off of a burn or a scalded part of the body. Cut off all the cloth you can with scissors and soak what remains stuck to the wound with olive or castor oil, vaseline, fresh lard or cream. Remove only when it comes off readily.

**Baking Soda** made into a thin paste with water should be smeared over the surface to keep it from the air.

Then apply the same paste to a cloth and cover the wound and apply a light bandage to keep it in place.



Burn.



Dressing for palm.

Treat shock or faintness with hot drinks, fresh air, and rest in bed.

**Burns from acids**—Treatment—wash off quickly with water, baking soda and water, or apply soap-suds.

**Alkali burns**, as ammonia, caustic soda, etc., wash off with water and apply weak vinegar, cider, or lemon juice—again wash off, and dress as advised for other burns.



Method of support and protection for burn of wrist.

## ELECTRIC SHOCK—RESCUE FROM LIVE WIRE.



Prying off wire or rail with dry wooden bar. Stand on a dry board.

Pull the sufferer quickly from the wire or electric rail, but grasp only his clothing, and this must not be wet.

Quick action is necessary.

Protect yourself with rubber gloves or a mackintosh, rubber sheeting, several thicknesses of silk or even dry cloth. If possible, stand on a dry board, or paper, or a dry coat.



Lifting patient from live wire.

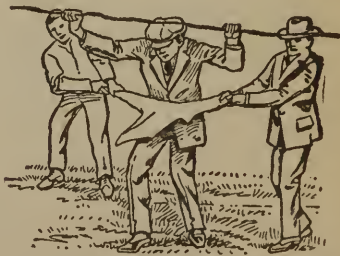


Pulling patient from live wire by his coat.

A live wire may be safely cut with a hatchet, or axe with a dry wooden handle, or the wire may be short circuited by dropping an iron bar upon it between the patient and the source of power. Be sure and let go of the bar before it touches the wire.



Pulling patient from live wire or rail with a dry folded NEWSPAPER.



Pulling patient from live wire with a dry coat.

## HEAT EXHAUSTION.

When an individual becomes faint, or is overcome by heat, there is usually great weakness, but seldom unconsciousness.

**Symptoms:** The face is usually pale and covered with clammy sweat, a weak and rapid action of the heart, and shallow breathing.

**Treatment.** The patient should lie down in a cool, well ventilated place.

Let him sip cold tea, iced coffee, or a little wine, or whiskey freely diluted.

For sometime afterward give one or two teaspoonfuls of Dr. Pierce's Golden Medical Discovery after meals, as a heart tonic.

## SUNSTROKE.

Remove patient at once to a cool, well ventilated place. Loosen or take off as much clothing as possible.

Apply ice or cold water to face, neck, chest and armpits.

A cold bath may be given, or wrap the patient in a cold, wet sheet pack, rubbing briskly to prevent shock.

As consciousness returns let the patient drink freely of cold water. If the skin becomes hot, the cold pack should be again applied.

No stimulants should be given, but for several days one or two teaspoonfuls of that excellent heart tonic, Dr. Pierce's Golden Medical Discovery, should be given after meals.

## FREEZING.

Gradually restore the warmth to the body by rubbing the limbs toward the body. As soon as conscious give hot tea or coffee in small quantities, or a little hot whiskey or brandy in frequently repeated small doses.

When the pulse becomes of good strength and the skin warm patient may be given a warm bath and put to bed.

To avoid pneumonia, move the bowels with several of Dr. Pierce's Pellets and give five or ten grains of quinine.

Two or three teaspoonfuls of Dr. Pierce's Golden Medical Discovery should be given after meals for several days.

### UNCONSCIOUSNESS OR INSENSIBILITY.

Alcoholic poisoning is the most common.

Patient may usually be partially aroused, pupils are natural size, or enlarged, and the eye-balls are sensitive to touch.

Apoplexy is caused by the bursting of a blood vessel causing pressure on the brain; this usually causes an unequal size of the pupils and the eye-balls are **not** sensitive to the touch, pulse is full and unnaturally slow. There is usually paralysis on one side of the body.

**Treatment.** Rest the patient with the head elevated. Apply ice or cold cloths to the head; heat should be applied to the limbs.

Give no stimulants.

**For drunkenness,** give an emetic of mustard and lukewarm water, followed with strong coffee, or a half teaspoonful of aromatic spirits of ammonia in water.

Keep patient warm and follow the advice given for Shock and Collapse.

Afterward strengthen the heart by using Dr. Pierce's Golden Medical Discovery in teaspoonful doses after meals, and absolutely prevent the further use of alcohol.

## CHAPTER X

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### BACTERIOLOGY

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#### Modes of Infection, Condition of Growth, Sanitation, Mosquitoes, Flies, etc.

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Wonderful and interesting is the study of micro-organisms which has unfolded so much to the investigator in these modern times, and marvelous is the human system with its perfect organism. Most interesting is the development of modern research in bacteriologic laboratories, and every trained nurse should know something about the essential facts of this fascinating science.

Bacteria are minute living bodies of the vegetable kingdom, and it is incorrect to class them as animals; they are commonly called germs or microbes, and it has been found by investigation that bacteria exist wherever vegetable or animal life has flourished. They are found in cultivated soil, in air, in water, in the skin, the mouth, the throat and in parts of the intestines, and always in the body.

One of the reasons for the advanced knowledge of Bacteriology is the perfection of instruments and methods which enable the student to travel along new and hitherto undiscovered paths of scientific research, notably the microscope, the *pure culture* method,—a discovery that has made it possible to isolate the individual organism—and the process of staining micro-organism with aniline dyes—a means of differentiating these minute bodies.

Warmth, suitable soil and moisture are necessary for the growth and development of Bacteria; therefore, certain parts of the human body afford good soil for bacteria and germs. The micro-organisms are divided into groups according to their method of development. Those that produce disease are called pathogenic and those that resist disease, non-pathogenic. It is indeed a wonderful arrangement when we realize that the beneficent white blood corpuscles are arrayed like soldiers to battle against infection when a wound occurs. The white cells destroy as many bacteria as their number and strength allow, and if they prove the stronger, disease is averted and the pathogenic—that is, the disease-producing bacteria—are defeated. If on the other hand, the wound or any infected part has a plurality of harmful germs, sufficient to overcome the gallant little white corpuscles, infection in a wound may take place with the formation of pus, which, as we have seen, may usually be overcome by applying iodine to the wound.

The diseases which are infected by the invasion of bacteria are contagious. Germ diseases are communicable as a rule, and in different ways. For example, typhoid occurs through the gastrointestinal tract, others through the mucous membranes, like pneumonia, diphtheria, scarlet fever. Tuberculosis of the lungs and grippe (or influenza) are communicated through the air passages. Typhoid and dysentery are taken into the system by milk, drinking water, and sometimes by food. The bacteria of pneumonia, diphtheria and grippe may be communicated by coughing or sneezing; hence the necessity of covering the mouth and nose when obliged to cough or sneeze. Wound infection is too often the result of unclean, unsterile hands or utensils. Sterile means free from germs of all sorts. There are other modes of germ transmission—by the particles of dust in the air, by the contamination of food and by inoculation through the bite of an insect, notably the mosquito.

When the United States built the Panama Canal, that region was fever laden, yet it has almost entirely been stamped out by modern sanitary methods and destruction of the mosquito. Also when the U. S. troops occupied Cuba, the city of San Juan and other places were unsanitary in the extreme, yet under enforced sanitary regulations, cases of fever were reduced all over the island and the oft-repeated warning to be clean in all things was typified.

The bacteria of typhoid, dysentery or cholera enter the system by way of the alimentary tract through contaminated water, milk, vegetables washed in contaminated water, or by oysters which have their beds in water into which drains enter, polluting it, and by the handling of food with unclean hands. Flies also carry infection and all foods should be carefully protected. They alight on decayed matter and carry disease germs to exposed edibles. Fortunately most people nowadays realize the danger from these little pests and keep doors and windows carefully screened. To quote from one authority—"It is a remarkable triumph of modern hygienic methods that during the summer of 1915 it is stated that a fly was practically unknown in the huge army medical camp at Etable, a camp where every Unit took care of one thousand sick and wounded. This was accomplished chiefly by having nothing exposed which would attract flies, excreta, garbage and grease. All manner of refuse was promptly collected and destroyed by burning. Grease from sinks and hoppers was collected systematically twice a day."—In a word every known precaution was taken, and the fact that for the first time in history a camp of wounded soldiers was entirely sanitary and as free from epidemic disease as the best equipped city hospitals, was largely due to this attention to sanitary details.

Sterilization is such an important factor in modern nursing and surgery that it is a part of a nurse's professional education to understand the various methods by which substance or bodies are rendered entirely free from bacteria. In the modern hospital, where every means for sterilization is found, this important process is easily accomplished, but in private homes the nurse must resort to more simple means of carrying out the sterilization. The most practical way is to boil all instruments, dishes, glass, metal—anything that can be subjected without injury—in boiling water, deep enough to cover them, and let them remain from fifteen to twenty minutes. This should be done in a porcelain lined or aluminum vessel with a cover. This rule, however, does not apply to rubber goods or sharp instruments, which require only from three to five minutes. In hospitals sterilization is always by steam.

The old sayings—"Life is but a circle of repetition" and "There is nothing new under the sun"—are often verified, and we find that

the process we call "Sterilization," (or purification) was practised by the Hebrews way back in Old Testament days. Every one knows that Jewish butchers pay great attention to the purity of the meat they sell. In the Book of Numbers, chapter thirty-one, verse twenty-three, there is an unmistakable reference to the purification of utensils used especially in religious observances—as follows: "Everything that may abide the fire, ye shall make go through the fire" and, "All that abideth not the fire, ye shall make go through the water."

The usual source of bacterial infection in surgical cases is through the micrococcus group which are termed the "pus-producing bacteria"; there are different kinds of these germs more or less virulent. Dirt and dust in dwellings especially in the thickly settled parts of cities where many families live in close proximity, is a fertile field for pus-producing bacteria, but when these localities are cleaned up, and the tenements disinfected during epidemics, there is always a remarkable decrease in mortality. In cases of wounds these bacteria invade the body through the injured surface of the skin or mucous membrane. They are also carried in water used for cleansing wounds, or by an unclean article touching the open wound which may create toxins and produce infection. Therefore, the extreme necessity of cleanliness in all things is evident and important. During the last thirty years the use of antiseptics has developed to a remarkable extent, consequently the average of human life has increased, owing not only to their use but to improved sanitary methods, all of which is material in the extermination of bacilli.

In the recent great war a French scientist made a careful study of a large series of war wounds of the extremities. It appears from his reports that practically all severe war wounds affecting the muscle and bone of the arms or legs are contaminated with bacteria from the first, yet not necessarily at once infected. Of 233 wounds examined by Sacquépé before any surgical treatment had been applied, 228 were contaminated, and five were sterile. Of 100 wounds of which cultures were made within twenty-four hours and before infection could be recognized, 85% gave staphylococci; 12%, streptococci; 40%, enterococci; 20%, diphtheroids; 68%, *B. perfringens*, and 25%, *B. sporogenes*, and a number of other forms in fewer cases. Wounds with communi-

tion of bone are in general more contaminated than simple wounds; that is, the gas bacillus was found in about 85% of the fractures of the lower extremities.

The important cocci are the streptococci and the staphylococci. Between the time of contamination and actual recognizable infection, a certain period elapses during which the microbes multiply; but the end of this period is not easily defined.

The contamination of a wound with subsequent infection is the result of the introduction of foreign bodies, such as projectiles, and fragments of clothing which are contaminated with the bacteria of the skin of external origin. It is about the foreign body that the microbes multiply first, and it is from here that they pass along the track of the wound and into the depths of the tissues. The number of bacteria increases rapidly and progressively for about thirty-six hours. The practical lesson to be learned from the surgical point of view of this scientist's work with the bacteria of infection is, of course, that intervention is the more likely of success the earlier it can be made. Thus the method of Carrel, (see Chapter VII) in taking care of wounds, should be applied as early as possible.

## CHAPTER XI

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### Common Sense Advice For The Expectant Mother.

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Many a truth is spoken in jest. The often quoted witticism of Oliver Wendell Holmes, the genial "Autocrat of the Breakfast Table," that "To treat a man successfully we must begin by treating his ancestors for a hundred years before his birth," is a case in point. For the pregnant woman it is a sermon in a sentence. While it is obviously an impossibility for her to do anything to the individuals who preceded her in the line of descent which will have any effect upon the unborn babe, she can and ought to so care for herself that she will pass through a comfortable pregnancy, experience an easy confinement, and bear a vigorous and healthy child in whom there is little, if any, inheritance of undesirable family traits, either of a mental or a physical character. What is necessary for this purpose is not a matter of great difficulty. It is within the ability of practically every woman with child, and is comprised in obeying the injunction to live a simple, natural and cheerful life. A knowledge of the signs and symptoms of pregnancy, how to meet the various conditions as they arise, and how best to lessen the discomforts which are sometimes experienced, are also material aids to this end,

## Symptoms

The symptoms of pregnancy named and described below are those which are most readily appreciable. None of the very early symptoms taken alone is positive proof of the existence of the condition under consideration, as any one of them may be caused by something else. The more of them present at the same time, the more certain is the probability that she who is experiencing them is pregnant.

The stoppage of menstruation is usually the first and most certain; as a rule it is complete, but occasionally the flow occurs once after conception, diminished in quantity and for a shorter time, at what would have been its next regular period. Very rarely it may continue, but slightly changed in character, at the usual intervals throughout the entire pregnancy. It is re-established in from eight to ten weeks after the birth if the child is not nursed by the mother, and as many months later if it is.

Morning sickness, or the nausea and vomiting of pregnancy, may come on a very few days subsequent to conception, but it does not ordinarily make itself manifest until the fifth or sixth week. It is experienced usually in the early morning and is aggravated by rising and moving about. It varies in severity from mere nausea or the raising of a glary mucus to the throwing up of part of the breakfast, and sometimes to the rejection of all food, no matter what its nature or what time of day it is eaten. It is seldom that it continues throughout the entire duration of pregnancy and usually ceases near the end of the fourth or in the early part of the fifth month.

The enlargement of the abdomen does not begin at once. In fact, for the first one and one-half or two months this part of the body is actually flatter than it is ordinarily, but at the end of that time it begins to assume a prominence. This, with the increase in the girth of the waist, grows rapidly greater, until about two weeks before confinement, when the size of the woman seems to have diminished.

Anywhere from about the termination of the first to the end of the second month some little irritability of the bladder may develop and persist with increasing discomfort, compelling more and more frequent urination, until the advent of the fourth month,

after which it usually subsides rapidly and soon disappears, together with its attendant troubles. With the enlargement of the abdomen there is a corresponding and proportionate increase in the size of the breasts. They take on a firmer, knotted character, and are much fuller, while a prickling, stinging sensation is felt throughout their bulk, but especially in the neighborhood of the nipples, which become sensitive to the touch, prominent and increased in size. The colored discs in the midst of which they stand become deeper in tint, spread out further over the surrounding skin, and by the end of pregnancy cover two or three times their original area. At this period, also, faintly tinted bluish, reddish or silvery lines in the skin have developed, which radiate over the breasts, and enlarged veins, forming a colored network beneath the surface, are much in evidence.

Quickening is the name given to the first unmistakable movements of the child in the abdomen felt by the mother. The time of its occurrence varies widely, but is generally from the sixteenth to the twentieth week. It was believed in olden times that it was at this moment that the unborn babe was endowed with life. After the fifth or sixth months the movements are most often so marked that they may be felt by the hand placed upon the abdomen, or even appreciable to sight. Not seldom they are so strenuous as to cause distinct pain. The absence of any discernible motion from conception to delivery does not necessarily mean that the child is not alive, or that matters are not progressing as they should. As soon as pregnancy is supposed or known to be established, by the evidence of one or more of these symptoms, the prospective mother must bestow more thought upon her diet, bathing, amount of exercise or work, her rest, her mental activity, her emotions, and the performance of the various bodily functions, so that by greater caution and care she will minimize the chance of any untoward happening. She must also wear such clothing as is adapted to the requirements of her new state.

### What To Eat

No invariable instructions by which the pregnant woman can diet herself, stating just what foods she may eat and what she may not, can be formulated. General directions only can be given, for what is permissible in a given case at one time may not be at another, and what agrees perfectly with one individual may dis-

tress some one else. Each woman should remember that she must provide for the physical demands of two beings—namely, herself and child—and to accomplish this she must eat generously of the food which is the most nourishing and most easily digested, personal preferences and dislikes being duly considered. It will be found invariably that the simpler articles, simply prepared, best meet the requirements. While meat contains strengthening and supporting elements of great value, an excess or even a very liberal amount of it must be avoided, as it tends to increase the size of the child and make its bones less supple than they should be—two factors which increase the difficulties of labor. Therefore it should be used in moderation, but not omitted altogether. It is preferable that it be served roasted, broiled or stewed, and not fried. Vegetables, fruits, eggs, butter, milk, and chocolate or cocoa, should be regarded as the main stays. There is no objection to tea and coffee in small amounts, unless there is some special condition of the nervous or digestive system which causes them to be contra-indicated. Rich puddings, elaborately-compounded pastries, undue quantities of candies, sweets, spiced or sour pickles, should not be eaten. Quite often a longing for special or unusual foods or dishes develops. If it is for things that agree well it may be yielded to, to a guarded extent at least; but if the craving is for unsuitable things, for those which cause distress or disturbance of the functions of the stomach or bowels, it must be denied. The course to be pursued by every pregnant woman is to eat food prepared appetizingly of the classes of those suggested as being the most useful. A few trials will show her which agree with her, and which do not. By continuing with the former, and discarding the latter, she will soon elaborate a dietary which is best suited to her own needs and digestive and assimilative powers.

### Morning Sickness

Regular hours for eating should be observed. Nibbling food between meals is more than merely detrimental; it is harmful. Ample time for the complete digestion of each amount taken must be allowed. During the continuance of the morning sickness, hot milk, cocoa or chocolate, will often prove of service, though occasionally ice cold milk seems the best, not only in partly allaying the trouble, but in causing a portion of the nourishment to be absorbed, even if all of that given seems to be rejected.

Solid food, however, should not be omitted entirely, if it is possible to continue with it. Later, when this symptom subsides or completely ceases, the problem of nutrition is not so difficult of solution, for the digestive powers increase, and the flesh lost in the early months is usually recovered.

The amount of exercise and physical work which is advisable or permissible depends very largely on the previous habits of the woman concerned. That overwhelming desire to indulge without limit in the hardest actual labor which seizes some pregnant women must be restrained. The same course must be followed in regard to long, tiring walks, running, dancing, horseback riding, conveyance in jolting vehicles, and the performance of fatiguing household occupations, such as a large washing or much sweeping, or labor which requires heavy lifting, or much going up and down stairs.

### Exercise and Rest

Every women with child, nevertheless, should take moderate exercise, for keeping the muscles in good condition unquestionably facilitates labor and favors a quick recovery, besides improving the digestive powers and the performance of the functional activities of the body generally. Those who have been accustomed to a life of muscular work, and to the actual care of the household in all of its many departments, should continue the lighter and non-exhausting tasks only; while those who have led a more or less inert or sedentary existence should prepare for confinement by exercises consisting of short walks, gentle calisthenics, or the assumption of the minor and unexacting home duties. In every case, fresh air and sunshine should be courted assiduously, and fair weather should be taken advantage of by riding over smooth roads in easy-going vehicles whenever an opportunity presents itself.

Although exercise is a requisite which cannot be omitted with impunity, the pregnant woman should never fail to take plenty of rest; a period of recuperation after even the least wearying work is always in order. Nothing should ever be started when she feels tired, and nothing should be continued after this condition develops. Simply ceasing activity is not enough; one should lie down in some quiet, comfortable place, where she will be free from distractions of all kinds until she feels well rested.

As much may be said of the necessity for sleep. Not only does it "knit up the ravelled sleeve of care," but it quiets the nervousness so common, brings to the muscles the relaxation they need at short intervals and improves the condition generally of both body and mind. Early retiring, late rising and a good long nap after the midday meal, is the routine to be observed.

During the pregnancy the future mother has to eliminate from her system not only the waste products resulting from her own bodily activities, but those produced by her rapidly growing child, also. As the skin is one of the principal excreting organs, and exhibits a marked tendency to become sluggish in performing its functions at such times, it is of prime importance that it has attention looking toward keeping it in good condition. For this reason, if for no other, bathing frequently and with regularity is necessary. A general warm bath, with a liberal supply of water and soap, should be taken every day. If it has been the custom for the woman to take a cold sponge in the morning, it may be continued if it still agrees; but it must be stopped at once if it does not. In the former case the warm baths may be taken less frequently, two or three times a week only, but never dispensed with entirely. It is best not to indulge at all in pond, lake, river or ocean bathing.

The clothing should be such as is suited to the season of the year. It need not differ from that worn on ordinary occasions, except that it should exert no pressure upon the breasts, as it will seriously retard their usual increase in size and cause the nipples to be shrunken into them and undersized, all of which conditions are quite sure to occasion pain and suffering later, and especially if the child is nursed.

When the nipples are in this state, no matter how it has happened, they should be given special attention particularly during the two months before delivery, consisting of drawing them out gently and massaging them daily between the thumb and fingers, with a rolling motion. If in addition cold water is applied to the breasts generally, with equal frequency, and the whole organ is briskly but not roughly rubbed, it will assist matters materially.

The abdomen or waist should never be closely confined, for the activities of these parts of the body should not be hampered in the breathing or other movements. Corsets and tight waist-bands interfere directly with the position the constantly enlarging womb

should occupy from time to time, and have an evil influence on the development and growth of the child; they also favor the occurrence of kidney troubles and inflammatory maladies of other abdominal organs, and hence must be done away with absolutely. This can easily be accomplished by supporting the garments from the shoulders. The best of the Common-Sense Waists, now widely advertised, illustrates this method, without sacrifice of appearances.

### **Mental Condition of the Mother**

If she upon whom motherhood is shortly to be conferred will but recollect that child-bearing is a purely physiological function, as natural as eating and sleeping, and that with proper care and attention to details the chances that she will pass through it successfully are one hundred to one in her favor, it will be of material value to both herself and her child. As the emotions are more easily stirred at this time than at any other, she should avoid everything she can that is unpleasant, disturbing, worrying, saddening or temper trying. In this she should have the assistance of her husband and family. She should occupy herself in pleasant tasks, keep her mind centered on the brightest things of life, and choose as her associates those who are of a happy disposition, who are not bores, and who never tell her doleful stories of what accidents and calamities have happened to some other woman similarly situated. She ought, further, to keep herself well in hand, try to maintain an even temper, to be cheerful at all times and endeavor to yield under no circumstances to fits of melancholy, peevishness, bad temper and general depression. These undesirable manifestations which are prone to occur are usually purely nervous reflex indications of her condition and have ordinarily no other reason for their appearance. In proportion as she is successful in these respects, she increases the probability of an easy confinement and of having a bright, happy and manageable child. It is beyond question that the mental attitude of the woman during pregnancy has a decided bearing on the disposition and mental status of her child; cheerfulness and even temper in the former begetting the same in the latter. The influence which maternal impressions produced by unusual or horrible sights have upon the physical structure of her offspring, is, as yet, questionable. If she has any such an experience she should give herself the benefit of the doubt and take an optimistic view of the situation. By a

determined effort that she will efface the occurrence from her memory, resolving absolutely that no mischief will result from it, and by engrossing her mind in some pleasing and absorbing pursuit, there is every probability that no ill result will follow. Nearly all of the gruesome stories regarding birthmarks are old woman's gossip or tales which have no, or but the slightest foundation in fact, and are the outcome of the morbid pleasure so many people derive from terrorizing their hearers.

### Value of a Tonic

To make assurance doubly sure that all will go well with both mother and child, before delivery and after, much can be done by the aid of good medical treatment. She with whom matters are progressing as they naturally should needs fortification against possible deviations from health which are probable, and she who suffers from any of them unquestionably requires it. No other one remedy for preventing complications and curing those which are actually present has ever approached, in value, Dr. Pierce's Favorite Prescription. It is a standard family medicine which has been before the public with an ever-increasing number of friends and advocates. It has been used in all the pregnancies of three generations of countless families—the mother, the grandmother and the great-grandmother bearing testimony to the fact that it acts as a shield against disaster and a "very prop in time of trouble" to the woman with child. It is prepared with a view of aiding both mother and babe, and has abundantly fulfilled its mission. It is a uterine tonic which strengthens all of the reproductive organs and enables them to do the work in which they are engaged with comfort; and it is an unrivaled agent in making childbirth speedy and almost painless. "Favorite Prescription" improves the general system and thus prevents many of the discomforts usually experienced. Being also a gentle sedative and free from alcohol, narcotic or poisonous principles, it banishes the countless nervous symptoms, such as irritability, groundless fear, depression and melancholia.

In view of these facts, which have been proven by the experience of not hundreds but thousands of women who have depended upon it to carry them safely through the trial which was before them, it may be regarded as the one medicine which has practically made obsolete the expression "the perils of childbirth." Further-

more, its effect upon the unborn babe is all that could be desired. Many a strong, healthy, hearty infant, born of a delicate, fragile mother, owes its good health and happiness of disposition to the fact that she used Dr. Pierce's Favorite Prescription from the beginning of her pregnancy throughout its entire course, and, in some instances, as long afterwards as she nursed it.

In those cases in which there is constipation, or a tendency at least to a sluggish action of the bowels, the use of Dr. Pierce's Pleasant Pellets will be of marked assistance. They should be taken so that they will cause one stool each day, but not of a very loose or fluid character.

The bedroom of the prospective mother should be the largest sleeping room in the house, well ventilated and light. It should receive a thorough cleaning a week or two before the expected confinement, and if the room has been occupied at any previous time by an invalid or anyone ill with a contagious or infectious disease, the room should be thoroughly disinfected with formaldehyde candles, or sulphur and steam, keeping the room closed for eight to twelve hours. The bed should be accessible from both sides. The mattress should be firm and under no circumstances should a feather bed be used. A rubber sheet which has been thoroughly cleaned should be placed over the mattress where the hips rest and over this may be spread a sheet or a protecting pad for absorbing the discharge.

An abundance of hot water and clean towels should be ready upon the arrival of a physician. The attending physician usually brings with him everything that is required in the way of drugs, stimulants, etc., but it is well to have in the house a small bottle of brandy or good whisky, fountain syringe, one or two basins, a bed-pan and a pound or two of absorbent cotton, two to four ounces of boracic acid, a rubber sheet (one and a half yards wide and two yards long), nursery cloth or cheese cloth (eight yards) for pads, unbleached muslin (two yards long and eighteen inches wide) for binders, carbolized vaseline (one ounce), and safety pins of various sizes.

## CHAPTER XII

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### The Prospective Mother—The Date of Labor

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Two hundred and eighty days from the first day of the last menstruation is the period of child-bearing.

This may be easily reckoned by adding eight days to the first day of the last menstruation, then counting ahead nine months.

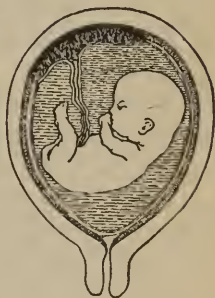
Suppose the beginning of the last menstruation was January first, add eight days, which would be January eighth, plus nine months which would be September eighth following. At about this time labor is to be expected, and would occur in nine cases out of ten.

**Labor** is simply a magnified menstruation. It is not a disease nor abnormality but a normal, natural manifestation of a woman's life, and as a rule is not associated with any particular trouble.

Millions are born every year throughout the world and but a small proportion have physicians to care for them. Skilled help is an advantage and should be had if possible, but it is not absolutely essential unless there is some accident or an imperfection of the woman's make-up, when a physician's help is invaluable.

Many times labor starts before a physician, nurse or midwife can be had.

What aid can be given under these conditions?



**NECESSITIES: HAVE THESE READY**

1. Soap for washing the hands.
2. Alcohol (one pint) for sterilizing the fingers.
3. Rubber sheet or if not to be had use clean, heavy or oven-baked paper, several thicknesses; these are put on the bed to protect it and covered with the pads, which are changed as necessary.
4. Quilted pads or a cotton coverlet cut up into pieces a yard square and baked in the oven for twenty minutes, each piece done up in paper and baked again to kill all infection in them.
5. Two pounds of absorbent cotton. If not to be had, substitute as much well-washed and clean cotton cloth, baked in the same way, to be used as sponges.
6. Sterile gauze or as much clean cotton cloth—all must be baked.
7. A clean agate or tin pail.
8. Sterilized vaseline, or lard free from salt, or even fresh butter. Sterilize by putting in a clean preserve jar and boil for ten or fifteen minutes. After two or three hours boil again.
9. A bath tub or bowl for the infant.
10. A four-quart fountain syringe and glass tips for douche.
11. For flooding and to cause stronger uterine pains, towards the close of delivery have Ergot, fresh fluid extract one ounce, on hand. Dose, a teaspoonful.
12. A teaspoonful of solution of one per cent. nitrate silver, and dropper for the baby's eyes; this is to be dropped into the eyes between the lids as soon as the child has been cared for. This prevents blindness.
13. A heavy cotton thread or small tape (sterilized by boiling) with which to tie off the umbilical cord, in two places close together; cut between, and apply alcohol to the stump attached to the baby.
14. Vinegar one half pint which is to be used as a vaginal injection in a syringe bag full of hot water if the patient has a *hemorrhage* after delivery.
15. Tincture benzoin may be applied to the nipples after each nursing with a clean camel's-hair brush.

16. Boracic acid dissolved in water should be used to wash off the nipples each time before the baby nurses.
17. A hot-water bag or jug of hot water covered with a clean towel to keep mother or babe warm.

## BABY CLOTHES

Four abdominal flannel bands.  
Three undershirts.  
Four flannel skirts.  
Four night gowns.  
Twelve white slips.  
Three knit bands.  
Four dozen diapers.

## LABOR PAINS

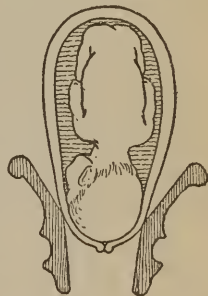
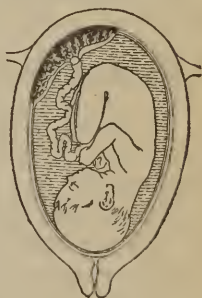
Usually about a week before labor the womb and child seem to settle down into the pelvis and some discomfort begins to be felt with pressure and discomfort in the bladder and lower bowel.

There is a sort of "tuning up" of the womb for a few hours or a few days before labor begins. Even false labor pains may be felt occasionally for an hour and then pass off.

**Regular Pains** usually begin with a pressure in the back, or backache and pressure on the bladder and lower bowel, these occur regularly, last a few second, and leave for about a quarter of an hour. They become more severe, gradually last longer as well as become more frequent; a little stain of bloody watery mucus is noted.

This is the show, and consists of a plug of mucus in the cervix which is pushed out by the contracting womb, pressing the bag of water out through the cervix and dilating it.

**Dribbling** of the **Water** that surrounds the child occurs as the head is forced down and the cervix fully dilates. This usually takes from six to twelve hours and is called the first stage of labor. During this time the patient may stand up, sit or kneel, all of which favor the dilatation of the mouth of the womb, but any effort to bear



down at this time is of no value.

Pains when severe and considerable are best borne by the patient lying down until the membranes rupture of their own accord.

## THE SECOND STAGE OF LABOR

The patient should be in bed prepared first with the rubber sheet or heavy paper over the mattress to protect it from soiling; second, the quilted cotton pad, and over this a large clean thick towel.

The patient should have on a short, clean, cotton coat to which are to be fastened at the sides sterile leggings (pant legs).

The privates should be thoroughly washed with hot water and soap and an injection used to empty the bowel of the stool.

The urine should also be passed so as to have the bladder empty.

The *pains* grow stronger and the prospective mother feels a desire to bear down, and cries out.

The muscles of the abdomen become firm and help to expel the child.

## EXAMINATION

By feeling of the abdomen the position of the child can be made out. If a natural birth with the hips and feet uppermost, the head will then be down in the pelvis.

In rare cases of a breach presentation, the head and shoulders are felt uppermost. Still less common, the child is felt cross-wise of the abdomen. An expert, by a full anaesthesia, can relax the womb and turn the child into a normal position. A cross-birth can sometimes be turned into a normal position, with the head downward by manipulation on the abdomen, between pains.

Internal examination may be made with antiseptic precautions, by an expert, but not by the ignorant, as it is better to trust to nature. Sterile rubber gloves should be used, or the hands held in weak solution of Chloride Lime, or Iodine.



The mouth of the womb will be found dilated, like a soft ring, and the back of the child's head directed toward the front or pubis, and covered by the bag of waters,

which feels like a soft membrane, through which the bony head of the child is felt.

## SECOND STAGE (Continued)



As the pains and contractions become severe, the sufferer should fill her lungs with air, close the mouth, and bear down hard, as if at stool. A twisted sheet tied to the foot of the bed, upon which the patient may pull, will aid materially.

*The head comes down with each pain, a pressure is felt on the rectum as though the bowels would move.*

A cloth, or piece of waste should be placed so as to collect the stool that will likely be forced out.

As the head begins to push, the perineum bulges out, and a moist, sterile towel should be pressed against the fundament or perineum to slow down the too rapid pushing out of the head of the child, thus to prevent a tearing of the vaginal outlet. If the stretch is gradual, it likely will not tear.

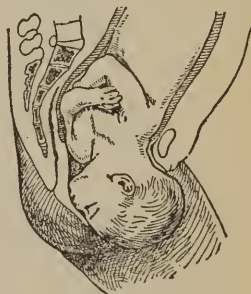
## CHLOROFORM

At about this stage the patient is given five drops of chloroform to inhale, just before each pain. During each pain the head comes out and afterwards seems to go back a little.

*Cord around the child's neck.* After a pain is passed, the forefinger of the midwife, nurse, or physician, should be introduced, to find out if the cord surrounds the child's neck.

It can be readily felt and should be gently brought out over the child's head so as to prevent strangulation.

The pressure of the sterile towel against the perineum is kept up during the pains and the back of the child's head gradually comes out, and is usually extracted between pains; first the back of the head then the forehead, eyes, nose and chin; all directed in a general way upwards toward the ceiling.



The mouth of the child is cleared of mucus with the finger wrapped in sterilized gauze.

After the head is out a brief rest is allowed when, with one hand on the abdomen, clasp ing the womb, and aiding it with a gentle grasp with the other, gently and gradually pull upon the child so as to draw out the lower shoulder over the perineum, then the upper shoulder is drawn out from under the pubic bone in front.

The perineum must be protected during this procedure by pressure of an assistant's hand covered with a moist sterile towel.

The remainder of the child's body is born readily and with it



comes the rest of the waters still retained usually behind the baby.

The assistant keeps up the grasp of the hand upon the abdomen and uterus which feels like a large grape-fruit in the pelvis. This is to prevent hemorrhage.

Usually, experts give hypodermically about one-third of an ampoule of *pituitary extract* just as the child's head appears, to stimulate the tired uterus to contraction.

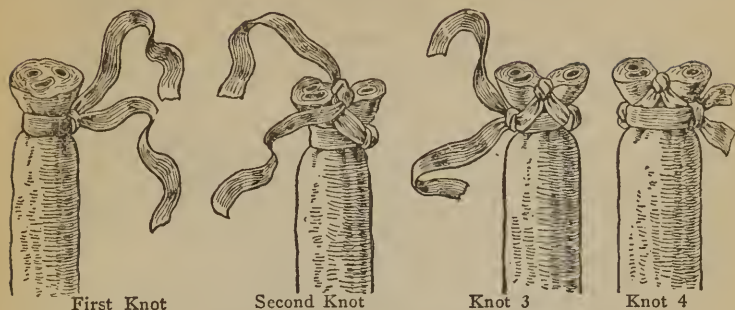
For others, *ergot*, in fluid extract form, is used instead, in a dose of a small teaspoonful in water, by the mouth. This aids delivery.

Just before the child is born a large sterile sheet is carried up under the patient's feet close to her bottom, and when the baby is born it is placed on this sheet and the cord tied, if the child has cried.



If it does not cry, hold the baby up by the feet, with head down, and gently slap its buttocks. If this fails, quickly tie the cord tightly an inch from the child's belly. Another ligature is tied about an inch or two farther away, and the

cord is cut between the two ligatures.



Method of tying the naval cord to insure against bleeding.



Baby in tub of warm water.

*A Hot Bath* should be ready, in which the body of the child can be immersed. For this, use a small pan, or dish-pan, of water, at a temperature of 115 degrees. Its face should be supported above the level of the water, its body should be curved forward like a half-moon; then lift the child out of the water and let its head hang down and backward, curved the other way. This will inflate the lungs. This may be repeated several times. Sprinkling cold water on its chest will sometimes cause it to breathe. This dipping in warm



water and sprinkling with cold, should be repeated until it cries well, after which it can be rolled up in the sterile sheet and a warm blanket and put in the crib—near a jug of hot water. It has just come from an abode in which the temperature is  $98^{\circ}$ , and must be kept warm.

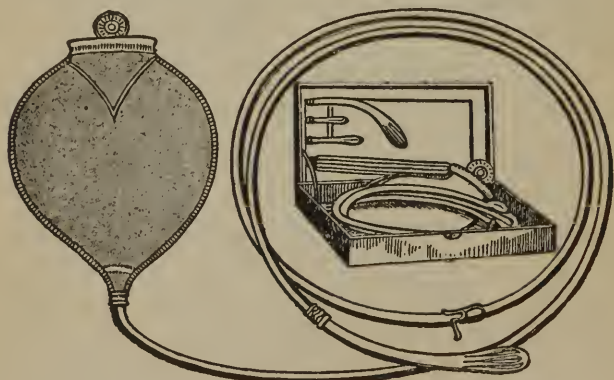
*The After-birth.* During all this procedure, someone has kept a firm but gentle grasp on the womb, with the hand on the abdomen—a douche-pan is placed under the patient's abdomen, and the third stage of labor begins, after about five or ten minute's rest for the mother.



*Pressure*, by grasping the womb, and gently squeezing it, as one would squeeze a sponge, is an aid to the natural labor pains and contractions of the womb.

Soon the placenta, or afterbirth, appears at the outlet of the vagina. This mass is grasped and twisted round and round as it comes away, at least several dozen times so as to bring away all the possible thread-like membranes attached to inside of the womb.

*Bleeding* only occurs when the womb does not contract thoroughly; the grasping of the uterus and the ergot that has been taken, prevent this. If flow occurs, give another dose of ergot,



Fountain Syringe.

and use an injection, well up into the vagina, by means of a fountain syringe, of one-half pint of boiled vinegar in a quart of water, quite as hot as can be borne,  $115^{\circ}$  Fah. temperature.

*An Antiseptic Douche* then is given, the most convenient being one or two quarts of hot water, in which has been stirred two tablespoonfuls of Tincture of Iodine.

*Wash the outside parts* also with this same solution, dry them with a sterile cloth, and remove the douche-pan and uppermost soiled pad.

*The Mother's chill* or shiver should be prevented after the child is born, by giving her a hot drink, such as a cupful of hot tea or hot milk. Those accustomed to it should have a little hot toddy.

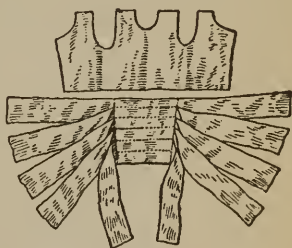
*Tears of the Perineum* should be stitched together at once, before the benumbed parts become sensitive.

*Dressing:* A folded, sterilized, clean piece of gauze, or napkin, is placed against the vulva, and a many-



Bandage for Breast and Abdomen applied.

tailed or other tight binder is applied around the abdomen



Many tailed bandage for Abdomen.

and hips, so as to bring the parts into their natural form and to aid in a support of the womb.

*The Baby.* First, put two drops of a one or two per cent. solution of Nitrate of Silver in each eye, and rub the lids; then wipe off the excess with a sterile pad and boric solution.



Cord Dressing.



Cord Dressing Applied.

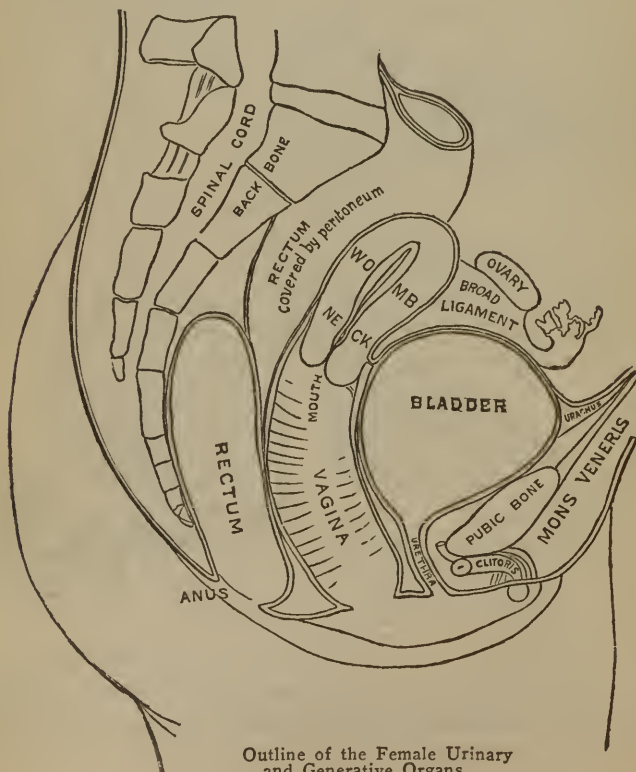
*The Navel Cord* of the child should now be dressed. Tie it a second time a half-inch from the skin, and touch the raw surface with Tincture of Iodine.

Cut a square piece of sterile gauze or cloth, and through this lay the stump of the cord; sprinkle well with baby powder, or powdered boric acid, place over it two or three thicknesses of sterile cloth, and apply the little belly-band.

Every day more powder is put upon the cord, and the belly-band is re-applied.

The baby should, after a few hours, be first sponged off with warm sweet oil—and daily thereafter bathed, by sponging off with mild soap and water. (Dr. Pierce's Medicated Soap.)

*The Cord* dries up. Some time about the tenth day, usually before, it drops off, leaving the navel as a little raw spot. To this, each day when the bath is given, a drop or two of Tincture of Iodine, with as much water added, is applied, and a dry sterile pad put on, under the belly-band.



Outline of the Female Urinary and Generative Organs.

## AFTER-CARE OF MOTHER

A half-teaspoonful of Ergot, Fluid Extract, should be given in water every four hours for about four days, then twice a day for ten days more. This causes the uterus to contract and to expel the natural discharges.

After a day or two, the head and shoulders should be elevated more and more, on pillows or a head-rest. This prevents back-ache and helps the action of the kidneys as well as draining the womb.

*The Bladder.* The urine is secreted rapidly after confinement, and the mother should be encouraged to pass it every four to six hours. At first it may be difficult, but the application of hot packs or the pouring of water into a bowl when the patient is on the bed-pan will usually start it. If not, a sterile glass catheter should be used and introduced by sight after careful cleansing of the parts with a solution made by dissolving one of Dr. Pierce's Lotion Tablets in a cupful of hot water. If the patient urinates, the external parts should be washed with this solution, dried with a sterile cloth, dusted with baby powder, and a napkin applied. This should be done at least, every six hours.

*Piles.* After the birth the lower bowel will be found very sore and tender. This usually disappears in a few days but may be greatly relieved by packs of hot water, or cold water, applied occasionally, and the use of Dr. Pierce's Pile Ointment, which can be procured in any drug store or direct from Dr. Pierce by mail.

*The Bowels* are partially paralyzed, so two days after labor a large dose of castor oil or two or three of Dr. Pierce's Pellets should be given. This cleanses the bowels without the bad effects of salts and other laxatives which withdraw fluid from the system that prevents the activity of the breasts.

*Bowel Injections.* It is also necessary to use injections daily for the bowels, because they have been so pressed upon that they have lost their tone or power. For this purpose a pint of milk with a cupful of molasses is about the most efficient, although soap suds, with or without castor oil, or a teaspoonful of Epsom Salts and a few drops of turpentine is good.

*Nursing the Baby.* The milk usually appears about the third day.

As soon as the mother has had three or four hours' rest, the baby should be put to the breast and this should be done every four hours during the daytime, but not at night until the secretion of milk is established.

*Nursing.* Five minutes at a time is about as long as the child should be let nurse for the first three days, or the nipples will become tender.

*Benefit of Nursing Child.* It causes contraction of the uterus, and thus expels the blood-stained mucous discharges that cause fever.

The child gets a laxative from the breast that empties its bowels of a chocolate colored creamy fluid that is replaced or followed a few days afterward with the golden yellow digested mother's milk.

*How Often Should The Baby Nurse?* This question is fully considered in the pages devoted to "Mother and Babe." (Chapter XIII.)

Sometimes when it is desired that the mother shall sleep at night, the baby may be given an ounce of warm sweetened water from a nursing bottle, which will quiet the child.

For colic, a little peppermint water may be added.

*The Nipples.* Each time before the baby nurses, the nipples should be cleansed with a solution of boric acid—about a teaspoonful in a cup of water.

After the child nurses, the nipples should be dried and painted with three coats of Compound Tincture of Benzoin, applied with a camel's hair brush, to a surface as large as a silver half-dollar, surrounding the nipple. Let this dry, then cover with a piece of sterilized cloth. Sometimes they become sore, and a nipple shield has to be used for a few days to protect them when the baby nurses, or a breast pump may be used and the child fed with the mother's milk from a bottle.

*To Increase the Milk.* Suckling by the child is the best stimulant. If the milk lessens or gets thin, then give plenty of milk and cream, sugar, starches, oatmeal and rice, to the mother. Some-



Cell and  
Breast  
Bottle.

times a little ale or stout will stimulate the mother's appetite. Dr. Pierce's Ironic Tablets also give tone, increase appetite, and help also to reduce the womb to a normal size, after childbirth.

*Caked Breasts* are best cared for by frequently nursing the child, and if required, the application of hot cloths wrung from alum water and the wearing of a breast binder, not too firmly applied.



Breast Binder Applied.

*Breast Binder.* For the first few days it is advisable to bind up the breasts so as to keep them from hanging uncomfortably.

Massage of the breasts usually does no real good, while it often makes them sore.

*When Shall the Mother Get Up?* About the sixth day the commode may be used at the side of the bed for the stools and relief of the bladder. The patient should have assistance at first, so as to avoid faintness.

After the tenth day those who do well, can sit up in a chair, or walk a few steps.

*To Prevent Prolapsus.* We advise our patients to strengthen the supports and lessen the size of the womb by the use of Dr. Pierce's Favorite Prescription, a teaspoonful after meals, three times a day.

One or two of Dr. Pierce's Pellets should be taken at night to keep the bowels regulated.

The use of Dr. Pierce's tampon Suppositories are of great benefit to hold the womb up when it is over-heavy after confinement.

*Return of Menstruation.* As a rule, from four to eight months will pass before the changes recur in a nursing mother. It returns



The Uterus, Tubes and Ovaries.



Ovulation.

much earlier in mothers who do not nurse their children, and usually the first or second unwell period is often profuse,

Hot vaginal douches should be kept up twice a day for weeks. Use one of Dr. Pierce's Lotion Tablets dissolved in water as hot as can be borne. The patient's head should be elevated on three pillows when these are used.

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Valuable advice will also be found in the following chapter, "Mother and Babe." Some discrepancies may be noted, but Chapter XII contains the latest advice in some particulars and should be followed.

## CHAPTER XIII

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### MOTHER AND BABE

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In this article it is our intention simply to give a few hygienic rules, which, if followed, will have a tendency to keep the nurs'ing in health and vigor.

Cleanliness, pure air, proper food and clothing, are necessary for the health and happiness of both mother and child.

If the mother has a cross baby, in all probability she has no one to blame but herself. If she has been cheerful and satisfied with her condition during pregnancy the chances are that she will have a good-natured baby. The baby may cry more or less during the first two or three months, but a reasonable amount of crying is to be expected; and, if otherwise well, taking food regularly, gaining in weight, etc., with no symptoms of disease, an occasional cry should cause no alarm, but rather be considered as a part of its necessary exercise. During the first few hours, at least, crying may be considered an indication of vigor.

If inflammation of the eyes develops at any time during infancy, especially soon after birth, a physician should be consulted at once. The first sign of trouble noticeable is that on awaking from sleep the eyelids are slightly glued together. Their edges are red, and on turning down the lower lid a little white matter may be observed; light causes pain, and there is a tendency to keep the eyelids closed; the lids may swell and become red on their external surfaces, and a large quantity of matter may be excreted. Blindness may result, unless proper treatment is instituted at once.

Inasmuch as inflammation of eyes during first week of infancy may cause blindness, preventive measures are of the utmost importance. All up-to-date physicians realize the necessity of proper treatment in such cases. No time should be lost in calling your family physician, or a physician who makes a specialty of diseases of the eye.

This book may reach many who live twenty to one hundred miles from a physician, and for such this advice is given.

The Crede Method is now universally used to prevent possibility of blindness. Immediately after birth, before the cord is tied, the child should be placed upon its back in the bed, the eyelids carefully cleansed, then parted and two drops of a two percent. solution of nitrate of silver should be dropped in each eye with a medicine dropper. When there is reason to suspect gonorrhœal contagion, this should be repeated on the second day, but not again without consulting a physician.

When the disease is fully developed in one eye only, the other should be protected with a bandage. The nurse should wash her hands before and after attending to this application and unless both eyes are affected should not use the same piece of absorbent cotton for both eyes, but a fresh supply should be at hand for each application. The nitrate of silver solution should never be stronger than two percent. and should be freshly prepared within a few days before confinement. It should also be kept in an amber-color bottle, preferable glass stopper, in a dark place of ordinary temperature.

In a few minutes after birth the cord should be firmly tied about three inches from the child's body with a stout piece of twine or tape, and it should be tied again about an inch farther on. Holding the cord in the palm of the hand, a cut should be made with dull or blunt pointed scissors between the two ligatures. The tying should be carefully done, otherwise the baby might bleed to death. The little one should then be wrapped in a warm blanket or sheet, laid in a warm place, not in a chair where some one may sit on it, but out of the way until the mother is cared for. Under no circumstances should the stump of the cord be greased (in accordance with old customs), but instead should be dusted with powdered boracic acid, subnitrate of bismuth, or baby powder, and wrapped in absorbent cotton or dry linen. It is necessary to keep this dressing dry and in due time this piece of the cord will drop off. Force must not be used. No attempt should be made to deliver the after-birth by pulling on the cord.

The first ten days after arrival of baby, and in some cases a longer period, mother and baby should not be on exhibition. Both should have plenty of sleep and see only members of the

family. A few hours after arrival of baby, the father, or some other member of the household, may have an idea that baby's head is not the right shape and the body is out of proportion in other ways. There is very little danger, however, of permanent disfigurement, and the restoration to a normal condition should be left entirely to Nature. Occasionally, within a day or two following birth, an infant's breast may become swollen, hard and painful, secreting a thin fluid resembling milk. No pressure should be used to remove the secretion, as it will only aggravate the trouble and may cause serious inflammation. In severe cases, when the surface is red, much swollen, hard, and tender to the touch, a warm water dressing must be constantly applied.

After the mother is attended to, the baby should be rubbed all over with sweet oil or fresh lard. Next wash off the coating with a soft cloth or sponge, warm water and soap. A flannel band and a diaper are then put on, the baby is wrapped in a warm flannel or blanket and allowed to sleep. It is a mistake to feed the baby immediately after birth unless advised to do so by the attending physician. If the baby is placed to breast a few hours after birth it has a beneficial effect upon the mother in many ways and the baby receives all the nourishment necessary. Usually the milk appears in the breast within twenty-four to forty-eight hours following birth, and if Nature intended earlier feeding provision would have been made. Therefore we advise that no drugs, sugar, whisky, or food be given. After the baby and the mother have received proper attention, both should be allowed to sleep for a time, and upon awaking the baby should be placed at the breast for a few minutes. During the first few weeks the baby may sleep fifteen or eighteen hours out of twenty-four.

During the early months of life, the most extensively used bed for the baby is the Bassinet. This consists of a wicker basket, having high sides and standing somewhat higher than the ordinary bed, thus avoiding drafts near the floor. It is light, easily moved and without rockers. A large oval clothes-

basket can also be made into a very comfortable bed for the baby, serves the same purpose as specially constructed and elaborately fitted Bassinets, and is much more simple and less expensive. It should measure thirty-two inches long, and should be supported by a low stand or two chairs. Such a basket fitted with warm blankets and its sides protected with a light blanket will answer very well until about the eighth month when the child should sleep in a crib or child's bed.

For the first three months it should nurse every two hours, from five to twenty minutes, from early in the morning, say five or six o'clock, until ten or eleven at night and from that time it should sleep at least six hours without nursing. This gives the mother six hours of uninterrupted sleep. Remember the baby requires water the same as any other human being, and many times when it cries it is not caused by colic or hunger, but by thirst. The water should be boiled and cooled—not ice cold. It is best to give one or two teaspoonfuls, in half-teaspoonful quantities, three or four times during the twenty-four hours.

The stomach of the new-born infant holds only about two tablespoonfuls, or one ounce. Therefore the first day after birth it should receive at one feeding, that is, if fed from bottle, one to three tablespoonfuls at a time; two to six weeks, two to four tablespoonfuls; six weeks to three months, six to eight tablespoonfuls; six months, ten to twelve tablespoonfuls; at ten months, sixteen tablespoonfuls. If the baby is nursing, it is not necessary to regulate the supply, but allow the baby to nurse until satisfied and asleep. The amount of food is gradually increased as the child grows older. A large baby requires more food than a small one. A baby should not be nursed every time it cries and under no circumstances when suffering from colic as that would only aggravate the trouble later. The baby's training must begin early, otherwise the mother will have many wakeful hours and nights of worry which could have been prevented. A baby who gets in the habit of being regular, sleeps better, gains in weight, is less nervous and irritable, consequently causes less trouble.

Regularity in nursing is as essential to the interests of the mother as to those of the child. The nipple is injured by prolonged or frequent maceration. The milk becomes concentrated by over-frequent suckling, thin and dilute when the intervals are too prolonged. For this reason the child should not be permitted to sleep in the same bed with its mother, for under such circumstances nursing may be irregular, and, furthermore, the mother does not receive the rest she otherwise would. A very young babe should be placed in its little bed not later than six or seven o'clock in the evening. It should be awakened every two hours during the daytime to nurse, but not at night. If the baby is asleep at five o'clock immediately after nursing, it should be awakened at seven and nurse, allowed to sleep until nine and nurse again, and then, unless the mother retires for the night, should after interval of two hours (at eleven o'clock) be nursed for the last time.

The bowels usually move within twenty-four hours after birth. The first movement is usually dark, like tar, in appearance; later, yellow. If the bowels fail to move within twenty-four hours the family physician should be consulted, or, if he cannot be obtained, a teaspoonful of pure, sweet oil should be given. The new-born infant usually has a movement of the bowels two to four times daily for the first two months; after that about once a day. The movement has the appearance of yellow cream.

One of the most frequent ailments of the infant is constipation. To relieve this condition, the diet must be regulated carefully and correct habits formed. Correct habit is of as much importance as the diet in the prevention and correction of constipation. If the bowels fail to move regularly every day, drugs internally, or gluten or glycerine suppositories may in extreme cases be used, but only temporarily, for the constant use of drugs in this condition should, if possible, be avoided. Where other means fail, pure olive oil, a half-teaspoonful or a teaspoonful may be given once or even twice daily, or if the case is an urgent one, Castor Oil or Dr. Pierce's Laxative for

Children may be given, the dose to be regulated according to age. Orange juice, from a fresh, sweet orange, may be prescribed in doses from a teaspoon to a tablespoonful an hour or so before nursing. Prune juice may be used in the same manner. Very acid fruits should not be allowed during the nursing period. Infants at three months of age may be taught to have stool regularly by placing upon a small chamber or the Nursery Chair at a stated hour. In older children, a fixed time should be set for the daily visit to the toilet. The best time for this is just after a meal, preferably breakfast.

Constipation is perhaps more common in breast-fed infants, and may be due to a minimum amount of food or milk that is low in fat. If the babe is nursing, the quality of the mother's milk should be improved, if possible. If not sufficient the mother's milk may be analyzed by chemist to determine the amount of fat it contains, or it may be analyzed for any other reason, provided the infant is not doing well. Between nursings. the infant should be given water.

In some cases, one or two teaspoonsful of cream may be added to each bottle, if a bottle-baby, or Cod Liver Oil may be given in half to teaspoonful doses before nursing. However, this is usually objectionable on account of the taste. For a slight change in diet, we suggest one or two teaspoonfuls of thoroughly cooked oatmeal, cooked an hour or longer, to about the consistence of cream. This, of course, is not intended for young infants, but from the eight or tenth month. It may be sweetened with sugar and strained, if necessary, and may be given once or twice a day, or oftener if the case requires it, preferably at nursing time.

Malted milk, prepared with barley may be given, or Mellen's Food with milk, taking care not to disturb the infant's digestion by too frequent use of any of the articles mentioned, or too large quantity. Only one remedy should be used at a time. Babies fed on properly modified milk seldom require drugs for this condition.

Stomach and intestinal indigestion in young infants is frequently due to improper feeding and disappears when the child is put upon a proper diet. It may be seen in both breast-fed and bottle-fed babies. It may be due to an over rich milk, or too frequent nursing.

In bottle-fed babies, the child may have been given for some time a food too high in one or more of the food elements, or a proprietary food, may have been used unsuited to the age or condition of the baby. Improper articles of diet—sugars and starches often cause this trouble.

Excessive quantities of the above during infancy should be avoided. If the food is not properly digested, there may be curd in the stool, indicating the baby is receiving an over-supply of nourishment which it cannot properly digest. The indications are in such cases to lessen the amount of feeding.

Breast-fed infants should not be nursed irregularly nor too long; for a young infant once in two hours during the day and at no other time. Before nursing, it may be given five to ten drops of Fairchild's Essence of Pepsin in cool water which has been boiled.

If diarrhea is present, resulting from irritation of undigested foods, the child is passing curd, is nervous, fretful, skin dry and some fever, the first thing to do is to empty the bowels and expel the undigested food which is causing the irritation. Castor oil, from a half to a teaspoonful, or Dr. Pierce's Laxative for Children may be given for this purpose.

If the buttocks are red and the movements smell sour, ten to fifteen drops of lime water may also be given in a little water before nursing. If the movements smell sour and there is no diarrhea, Phillips' Milk of Magnesia may be given. Five to ten drops for a young infant at each nursing has a tendency to relieve this sour condition, also constipation.

If these remedies cannot be procured, one-half teaspoonful of bicarbonate of soda or salaratus may be dissolved in half a glass of boiled water which should be kept covered, and a small teaspoonful may be given every two to four hours as necessary

until the stools no longer smell sour. If the baby does not improve within a few hours, send for the family physician.

If an infant nursing at the breast is troubled with constipation it may be unnecessary to give the little one any special treatment, as this trouble can frequently be remedied by harmless remedies given to the mother. If a nursing infant is constipated, we usually find the mother troubled with the same complaint. Ordinarily, we would advise the mother to take Dr. Pierce's Golden Medical Discovery, one teaspoonful, from three to six times daily; if taken only three times daily, it may be taken in a little water before meals. This remedy is absolutely harmless. It contains no poisonous drugs, no opiates of any kind and no alcohol. It is a purely vegetable preparation and has a tonic effect upon the stomach, liver and bowels. The dose may be increased or diminished in accordance with its effects.

Dr. Pierce's Pleasant Pellets may also be taken, if necessary, for constipation. The mother may take one at bedtime or early in the morning before breakfast, and if this fails to give one movement she may, the following day, take two, and, if necessary, increase to three or four. Usually two "Pellets," at bedtime, have the desired effect and in most cases it is not necessary to take this number more than two or three times each week.

The diet of nursing mother is of much importance. For a few hours after confinement, the exhausted condition will certainly call for rest, hence sleep is imperative, after which some form of stimulation may be required. This can be accomplished by giving plain, wholesome foods, chicken broth, beef broth, weak tea or strained gruel, also milk toast and warmed sweet milk, to which may be added a pinch of salt. Each woman's case must be considered upon its own merits and if any special diet is necessary, the attending physician should advise. If warm drinks are not well borne, cold drinks—buttermilk, sweet milk, ice tea should be employed. In some cases, small quantities of ice cream. Where there is much stomach irritation, it is wise not to give solid food for the first three days, then give meat broths, gruels and milk. After the third day, if the bowels

have not moved, buttermilk added to the diet, stewed prunes and peaches will assist in causing a natural movement of the bowels.

After the mother is up and about, it is not necessary that she should change her usual mode of living to any great extent, provided she is not digressing from the laws of health. Her food should be nourishing and she should avoid all foods of any description which cause indigestion. She should eat slowly and masticate the food thoroughly. A daily evacuation of the bowels should be obtained. Foods which disagree with the mother, disagree with the babe. Indigestion in the mother is usually followed by the same condition in the nursing.

#### LACERATION OF PERINEUM AND CERVIX.

Laceration of perineum means laceration of tissue between the lower part of vagina and rectum. Laceration of cervix means a tear at mouth of womb.

The usual cause of laceration of the pelvic floor and perineum also of cervix is childbirth, a large head or body, hurried labor, rigidity of the tissues, also improper use of instruments.

As the child's head passes through the pelvic outlet, the structures are greatly stretched and if it is the first baby there is frequently more or less laceration. In many cases the laceration is so slight as to be hardly noticeable and does not require surgical attention. In some cases it is moderate and may cause trouble later; in other cases severe, extending chiefly into the tissues in pelvis or in rectum. Besides the outward laceration produced by labor, the muscular structures of the pelvic floor are often torn, and this may occur without any external bleeding. To the eye all may seem normal.

If the laceration is not repaired, falling of the womb may result and other conditions, producing the following symptoms: Dragging or weight in abdomen, difficulty in passing urine or frequent desire to pass water. Diarrhea may be present in some cases, inability to control bowel movement, and in other cases difficulty in emptying the bowels. After menstruation is re-established, the flow may be excessive, leucorrhœa may occur

and sterility. There may also be a downward displacement of the bladder. The woman is often despondent, nervous and irritable—complains of distress in abdomen, backache, indigestion, headache, etc.

#### TREATMENT.

In severe laceration nothing is of permanent value except surgical repair measures which are capable of establishing permanent benefits. The object of the operation is to restore the pelvic floor, or support of pelvic organs. The operation does not necessitate opening the abdomen. We seldom find it necessary to use a general anaesthetic as chlorform or ether but secure comfort during the brief time required to stitch the parts together by using a local anaesthetic.

#### BATHING.

As a general rule an infant should be bathed once a day but never immediately before or after being nursed or fed. A baby bathtub may be used for this purpose, but unless the baby seems to thrive and do well it may not be advisable to immerse the infant in a bathtub more than every other day; wet the face and head before immersing the body in the tub. The little one may be sponged with warm water in the evening as well as in the morning; the water should be warm but not hot. The temperature of the water can be judged by testing it with the elbow, which is more sensitive than the hand. Lay a blanket on the lap, cover the child with flannel. Use cheese cloth for bathing, which should be thoroughly cleansed by boiling in water after each bath. The temperature of the room should be near 80° for the bath, but at other times about 70°.

The mouth of the infant should be thoroughly cleansed at least twice daily, night and morning, with a small piece of linen or cheese cloth which has been dipped in a saturated solution of boracic acid. Great care should be taken to wash the roof of the mouth and under the tongue; all parts should be cleansed thoroughly to avoid sore mouth. (The same care regarding cleanliness of nipples should be taken after nursing.) For the bath the very best soap that can be obtained should be used—

pure castile, ivory or any other soap that is known to be absolutely pure. After the bath the body should be carefully dried, and if the buttocks or any other portion of the baby's body is red it should be powdered with baby powder. Napkins, or diapers, should be changed frequently during the day, in fact every time the baby is wet and after each movement of the bowels, otherwise the buttocks will become very sore. For the first few days, with exception of first bath, baby should not be immersed in the tub, but receive only sponge bath until stump of cord has healed.

Have the infant's clothing loose, using only a few safety pins and buttons, allowing an easy change of garments and freedom of motion for the limbs. All parts of the body except head should be protected. The belly-band may be discarded after stump of cord has healed. It serves no useful purpose after that time. A medium weight or very thin woolen undershirt may be worn for warmth after discarding the belly-band, the weight of garment depending on the time of year the change is made. The belly-band, like the rest of clothing, should be loose enough to admit two or three fingers underneath it. The feet and legs should be protected with woolen socks reaching to the knee. The custom of allowing children to be dressed in a way to leave their legs and knees bare is a dangerous practice. No child should be overburdened with clothing, but it should be kept comfortable, in pure air, out of draughts, with clean, dry clothing, protecting the little one who, it must be remembered, is exceedingly sensitive to sudden changes in temperature.

In selecting shoes for an infant it is very necessary that they should fit properly, as an infant's feet are plumper than those of an adult, and the tissues, especially the bones, are softer. Badly constructed shoes may cause deformity. The shoes should be long enough to bend the toes down and backward upon themselves, and not cramp them. It is a mistake, however, to have them too long, allowing the foot to slide back and forth. The shoes should fit snugly about the heel and instep and easily at the toes. The best method of fastening is by lace.

After the third or fourth month baby should be laid in center of a soft mattress several times daily and allowed to exercise the arms and legs, in fact, all the muscles. This is Nature's way of preparing the infant for a more difficult task of creeping and walking. When baby creeps, do not urge it to walk. The only safe plan is to let the child teach itself. Any assistance at such times has a tendency to cause deformity of spine and legs.

#### OUTDOOR LIFE.

Daily airings are necessary for perfect health, and if baby is born in the summer months it should be taken out daily in pleasant weather after the second month. A young baby's eyes should be protected from strong light, not only from sunshine when in the open air, but from any light which is very bright. In the open air the cover of carriage should be so adjusted that the sun will never shine in the baby's face. A child born in the fall or winter months, as a general rule, should not be taken out in the open air, until about the fourth month. In cool weather the baby should be taken out about one hour in the forenoon and half an hour in the afternoon. In the summer time it should spend the greater part of the day in the open air. In damp or rainy weather, either summer or winter, particularly with a strong wind blowing, it would be best to keep baby in the house. It is also best not to take baby out when the temperature is below fifteen degrees above zero.

In selecting a baby carriage, the mother must remember that the baby is a tender creature and very easily hurt. The carriage should run smoothly without jolt or jar. It should be well-balanced so there will be no danger of tipping over. The wheels should be kept from creaking, and the bed in the carriage should be soft and comfortable.

The baby's bedroom window should be left open at night after the third month, except when the outside temperature is below the freezing point. At all times in every season of the year, the room should in some way be ventilated, and unless the child is very delicate and has a tendency to bronchitis or croup, it

should be taken out every day, winter and summer, if in a baby carriage with the cover protecting from severe winds. In pleasant weather, the carriage should be placed in some protected corner of the garden and the child sleep in the open air.

As previously stated, the head of a young baby must not be exposed to the direct rays of the sun when it is extremely warm, nor the eyes to the bright sunlight. The more fresh air the child gets, the better prospects of health.

The open air treatment is as necessary as food, and even delicate, pale children, unless suffering from croup, should sleep with bedroom windows open at night, and in either case should be out in the open air during the daytime as much as possible. Keeping a child indoors for a slight cold is a mistake which is frequently made by over-anxious mothers, also in any acute illness where there is much fever, the child should have an abundance of pure fresh air. There is no danger of taking cold at such time. If the sleeping room is cold, the body should not be uncovered or exposed in any way to cold and exposure, for what is necessary is fresh air and what must be prevented is the loss of heat through undue exposure of naked limbs.

An observing mother knows the characteristics of the baby in health and can easily note any departure from the normal standard. Any change, such as restlessness in sleeping, with skin hot and dry which becomes more marked when awake, is an indication of fever. The baby usually desires to be taken up and carried about. The mother should notice the color of urine. If the baby passes a smaller quantity than usual, which is highly colored, this also is an indication of fever. She should also note the character of the cry, as described on a subsequent page. She should note the expression of the face, the frowning or wrinkling of the forehead in pain, the shrivelled old face in acute diarrhea, and the full face of measles and whooping cough. She should note any eruption; also, the color and character of the stools, frequency, etc. She should notice the breathing and the character of the cough. If very rapid and difficult, with cough, it might indicate any one of several dis-

eases, such as pneumonia, spasmodic croup or possibly membranous croup, and if other symptoms are present no delay should occur in sending for the family physician.

### COLIC.

During attack the abdomen is usually swollen and hard, distended with gas. Indigestion is the cause of practically all cases, and is most common during the first few weeks of infancy. The symptoms of colic are sudden attacks of pain, manifested by crying and the refusal of the infant to nurse. There are, of course, healthy babies, who at times, refuse to nurse, not on account of colic, but for other reasons, and at such times do not try to force the feeding, but allow baby to wait.

During an attack of colic, the baby is restless, has contraction of abdominal muscles and draws up the limbs. After the expulsion of gas from the stomach and bowels, the symptoms disappear as rapidly as they came. Under no circumstances should the baby be nursed during an attack of colic or immediately following. Feeding relieves temporarily, but aggravates the trouble later.

If the attack is severe, the baby may be immersed in water agreeably hot, first tested with the elbow, or a bath thermometer. The temperature should not be over 100 degrees. A rectal injection of warm water with castile soap may be given or a glycerin suppository, small size, may be inserted in the rectum, or a conical piece of soap dipped in warm water inserted in the rectum may give relief. Dry heat to the abdomen, preferably allowing the child to lie on stomach across a hot water bag, using precautions not to have the water too hot. The steam should be forced out of the hot water bag before screwing on the top. Hold the baby over shoulders so that its abdomen rests on shoulders and spank over lower part of back, just above buttocks. A drop or two of essence of peppermint, a pinch of bicarbonate of soda in a dessert spoon of warm water may be given, or half a soda mint tablet, dissolved in a tablespoonful of warm water. In severe cases paregoric, five to twenty drops in a teaspoonful of warm water—for young

infants not over five drops. Paregoric should be used only in extreme cases and the dose repeated in an hour, if necessary. If the skin is cold and infant exhausted following an attack, a few drops of brandy may be given in a teaspoonful of warm water. The injection into bowel of warm Chamomile Tea—one ounce of German Chamomile Flowers, one quart of boiling water, steep ten minutes, strain, use warm—not too hot, using no force to inject same, from half a cup or cupful or more, according to age of child.

If the attacks of colic are frequent and severe something is wrong with the milk, whether breast or bottle-fed, and the family physician or specialist on diseases of children should be consulted.

#### CROUP.

Croupy children should be guarded against exposure to wind and dampness. The most susceptible time is during the third year.

The treatment for the immediate relief of the paroxysm of simple croup is as follows: The child should be placed in a hot bath, first testing the water with elbow or a bath thermometer, and administer internally small amounts of hot water or an emetic, moistening the air with steam; using a steam atomizer if possible also has a beneficial effect. Syrup of Ipecac may be given, from ten to twenty or thirty drops, repeated every fifteen or twenty minutes until the child vomits, or until relieved of the pain. In some cases, the application of a cold, wet compress to the throat gives relief. A cold compress may be made out of linen, cheese cloth or ordinary wash-rag. It may be dipped in cold water, applied to the throat and covered with another towel. The water should be as cold as possible. This usually gives instant relief. If the child requires treatment for several days between these attacks, it must be administered under the advice of the family physician.

In Membranous Croup or Diphtheria the cough is usually dry and tight, may become loose or rattling; some wheezing or rattling can sometimes be heard in respiration. At first the child may not seem very ill, but have a slight fever, may com-

plain of sore throat. Spasmodic or simple croup may at times be mistaken for Membranous Croup or Diphtheria, therefore, if the child is not better in the morning; in fact, nearly well during the day time, a physician should be called at once, and if the case is Membranous Croup or Diphtheria, antitoxin should be administered in large doses. Diphtheria antitoxin has saved thousands of lives and should be administered in such cases in the beginning of the disease, the dose repeated as necessary according to the indications.

In true Diphtheria affecting the tonsils and upper portion of the throat, the diphtheritic membrane is visible to the eye, but in Membranous Croup it is not.

If inflammation of the eyes develops at any time during infancy, especially soon after birth, a physician should be consulted at once. The first sign of trouble noticeable is that on awaking from sleep the eyelids are slightly glued together. Their edges are red, and on turning down the lower lid a little white matter may be observed; light causes pain, and there is a tendency to keep the eyelids closed; the lids may swell and become red on their external surfaces, and a large quantity of matter may be excreted. Blindness may result, unless proper treatment is instituted at once.

Inasmuch as inflammation of eyes during first week of infancy may cause blindness, preventive measures are of the utmost importance. All up-to-date physicians realize the necessity of proper treatment in such cases. No time should be lost in calling your family physician, or a physician who makes a specialty of diseases of the eye.

This book may reach many who live twenty to one hundred miles from a physician, and for such this advice is given.

The Crede Method is now universally used to prevent possibility of blindness. Immediately after birth, before the cord is tied, the child should be placed upon its back in the bed, the eyelids carefully cleansed, then parted and two drops of a two percent. solution of nitrate of silver should be dropped in each eye with a medicine dropper. When there is reason to suspect

gonorrhoeal contagion, this should be repeated on the second day, but not again without consulting a physician.

When the disease is fully developed in one eye only, the other should be protected with a bandage. The nurse should wash her hands before and after attending to this application and unless both eyes are affected should not use the same piece of absorbent cotton for both eyes, but a fresh supply should be at hand for each application. The nitrate of silver solution should never be stronger than two per cent. and should be freshly prepared within a few days before confinement. It should also be kept in an amber-colored bottle, preferably glass stopper, in a dark place of ordinary temperature.

#### COLDS AND COUGHS.

If a child has taken cold, the first indications are watery eyes and sneezing with a discharge of mucus from the nose. Frequently grease the forehead and bridge of the nose with mutton suet or Lanolin, insert a little vaseline in the nasal orifices and if there is fever, indicated by hot, dry skin and flushed face, the treatment should be the same as in other acute fevers.

First a laxative, castor oil or Dr. Pierce's Laxative for Children, according to age. Either may be safely given to a child from eight months to one year of age, increasing the dose for children from two to four years of age. A hot mustard foot bath, or warm foot bath without mustard may be given for ten to twenty minutes, the child placed in bed in a room where the temperature is about 72°, with free ventilation.

#### MOUTH BREATHING.

If the child constantly breathes through the mouth, finds it difficult or impossible to breathe through the nose, it may be considered an indication of adenoids and possibly enlarged tonsils. Earache frequently accompanies this condition. A nose and throat specialist should be consulted and the adenoids removed if present.

## CONVULSIONS.

Convulsions are not uncommon in infancy and early childhood and are usually the forerunner of some severe illness. They may occur, however, simply from indigestion, intestinal worms, constipation, teething, etc.

During the spasm the child usually makes a choking sound, apparently ceases to breathe for a moment, becomes unconscious and stiff. The eyes are staring, rolling or squinted, the hands clinched, the mouth firmly shut. The face may become bluish from lack of air in the lungs, and then the jerking of muscles begins. Breathing may be irregular and noisy—the arms, legs and trunk twist about in all directions. The attack usually lasts from one to two minutes—sometimes an hour or more.

The child should at once have a warm bath, the water covering to the neck. Cold cloths, frequently renewed, should be applied to the head. The baby or child should be left in the water at least ten minutes, then wrapped in a blanket without drying. If the attack is due to indigestion or irritating foods, an emetic of a teaspoonful of Syrup of Ipecac may be given as soon as it is able to swallow. The bowel may be washed out by an injection of warm water. A hot bath and emetic usually prove sufficient. The water in bath should be very warm, but care must be taken not to burn the child. Test with the elbow or with bath thermometer—it should reach about 100 degrees.

If it is not convenient to give the child a full tub bath, cold application to the head, or an ice bag, if at hand, and placing the feet in a mustard bath may answer the same purpose.

Another convenient way of applying external warmth is by means of tolerably hot compresses. This is done by taking a large towel, or preferably flannel, dipping it in hot water, then wringing out the excess of water and wrapping the child in this towel from the neck to the feet. Care must be taken to avoid exposing the body of the child to cold air, especially when removing these hot cloths after about fifteen minutes to an half hour.

## EARACHE.

The pain is usually severe. The child often puts its hand to the affected ear and cries whenever it is touched. The ear should be irrigated with a solution of warm water, as warm as can be

borne. An antiseptic solution of twenty grains of boracic acid to the ounce would be better. Hot applications externally, dry heat, the ear having first been covered with cotton or linen, a small hot water bag or any other hot application that is comfortable may be applied. An ear syringe may be obtained at any drug store for irrigating the ear with warm water. If the attacks are frequent, a nose, throat and ear specialist should be consulted to discover the cause.

#### TOOTHACHE.

This occurs most frequently in early childhood, and is usually due to neglected teeth. Agreeably hot applications, such as a hot water bag against the face may give relief. If a cavity in a tooth is discovered, a small bit of cotton moistened with oil of cloves and packed well into this may give relief. A dentist should be consulted as soon as convenient.

A bruise or sprain should be treated at once to relieve pain and to lessen swelling. Applications of hot water by wet compresses, if continued for an hour or two, usually afford relief. A severe bruise to an infant's head should receive prompt professional attention.

In the treatment of cuts, burns and scalds, cleanliness followed by a soothing application, excluding air with a cloth bandage and outside of this absorbent cotton, is usually all that is necessary unless the case is a severe one, requiring the services of a physician.

#### FOREIGN BODIES IN THE NOSE.

Young children occasionally insert peas, beans and other foreign bodies into the nose. These may occasionally be removed with tweezers, if not inserted too far, but if not too firmly fixed they may be removed by closing the opposite nostril and causing the child to blow the nose forcibly. If any difficulty is experienced, it is better to call a physician. Tickling the nose or giving snuff to produce sneezing may remove the object.

#### FOREIGN BODIES IN THE THROAT.

If fish-bone or any other substance gets lodged in the throat, it may be removed by inserting the finger and thumb into the mouth, passing into throat as far as possible and making

an attempt to pull it forth. If it is a soft substance, it may be crowded further. Follow this with a piece of bread which should be thoroughly masticated and give half a glass of water.

Foreign bodies such as coins, pins or buttons which reach the stomach, especially coins and buttons, will not cause trouble. If pins, needles or any sharp substance is swallowed, the family physician should be consulted. Buttons and coins are usually passed through the bowels. Laxative medicines are not required in such cases, unless the bowels are constipated and in that event castor oil may be given.

If coins or buttons are swallowed, the child should eat bread or potatoes and the stools should be watched the following day.

#### FOREIGN BODIES IN THE EYE.

For removal of cinders and other substances of like nature it is often unnecessary to do anything if rubbing of the eye is prevented. In such cases the tears often wash the object away at once. If it adheres firmly, the upper lid should be seized by the lashes with the fingers and pulled away from the eye and well down over the lower lid and then let go. If this is unsuccessful, irrigate the eye thoroughly, using a medicine dropper and plain warm water, or better, boracic acid, ten grains to the ounce of pure water, pouring in ten, fifteen or thirty drops. The child should lie on its back with eyelids widely separated, and a considerable quantity, sufficient to flush the eye, should be poured in.

#### FOREIGN BODIES IN THE EAR.

In the case of such foreign bodies as peas, beans or buttons, no force should be used in removing same, but if no physician is available, the mother may try to remove the substance in the following manner: The child should be laid upon the affected side and the tip of the ear strongly pulled outward and backward, thereby stretching the canal, whereupon the object will sometimes drop out. If it does not, syringing with tepid water may be employed. For this purpose a small ear syringe, or any other syringe that will answer the purpose, providing it is absolutely clean, should be used. In syringing the ear, the child should be seated, the ear drawn outward and backward and the

nozzle of the syringe placed at the upper part of the opening of the canal.

If an insect crawls into the ear, sweet oil or castor oil may be poured into the ear at once, and the ear may a few minutes later be syringed with luke warm water—perhaps a half hour later.

#### NETTLE RASH, OR WHAT IS COMMONLY CALLED HIVES.

This skin affection often resembles the sting of bees, or other insects. The condition comes on suddenly. It may last a few hours or a few days. There is much burning, tingling, and sometimes itching. Indigestion and over-eating are the most frequent causes. Certain foods may cause this even in adults, who are frequently troubled after eating shell fish, lobsters, strawberries, etc.

In a child, a dose of castor oil or Dr. Pierce's Laxative for Children may be given, reducing the diet for a day or more. The skin may be powdered with any antiseptic baby powder, Colgate's, Mennen's or any other that can be obtained. In some cases to relieve the itching, equal parts of vinegar and water may be applied with cotton frequently. Castor oil applied externally with the finger tips, rubbing it into the affected parts gives relief.

#### PRICKLY HEAT.

This is seen in hot weather, especially in children who are too warmly clothed. Treatment consists of removing the cause. The irritated skin may be dusted with any of the antiseptic baby powders and the child given a dose of Dr. Pierce's Laxative for Children. A light diet should be followed until the rash disappears. A soda bath, one teaspoonful of salaratus or bicarbonate of soda in a pint of water applied with linen or sponge and allowed to dry, is comforting.

#### ECZEMA.

This is quite common in infants and may be of short duration, or last several months. It may affect a part or the entire body. Irritating soap, soiled diapers, over-feeding, digestive disturbances, or irritating underwear may cause it. Often no cause can be discovered. In some cases, the skin becomes a bright red, covered with pin-head sized vesicles. These may rupture, leaving the surface swollen, red and moist with a watery discharge which may thicken and form crusts. There is much itching. In another form, the skin may be dry, red and

thickened. Such cases should be under the physician's care. The cause should be removed, if possible. A laxative may be given occasionally or when necessary. The child should not over-eat.

Use olive oil for cleansing the parts in place of water and soap, or a lotion of starch and boracic acid instead of plain water. The antiseptic baby powders often give relief in the red and "weeping" form of this disease.

### DANDRUFF OR MILK CRUST.

Cleanliness usually prevents this condition, but when it is present any patches should be removed by soaking with olive oil, rubbing it in gently with the finger tips, to be followed with castile soap and warm water. A fine tooth comb should never be used under any circumstances. If the scalp has a raw weeping surface, it is probably eczema—not dandruff. In older children with dandruff, the scalp may be shampooed once a week with tar soap and warm water, after which a very little vaseline or olive oil may be rubbed into the scalp.

Lice are usually found in the unwashed, but any child may be infected by them through contact with another. The first symptom is a very decided itching of the scalp. Inspection shows the nits attached to the hair. A fine tooth comb may be used for removing same. Soap and water alone are insufficient. The best application is the ointment of Larkspur Seed, which should be rubbed into the scalp once daily for a few days in succession. The hair may be washed repeatedly with vinegar, but usually one or two applications of the Larkspur are sufficient.

### BEDWETTING.

This is a disease usually not serious, and is not always a habit and the child should not be punished for it. Wetting the bed or the clothes, incontinence of urine, is not usually an indication of disease of the kidneys or bladder, but it is well to have the urine examined.

The child should have a light supper and fluids just sufficient to quench the thirst after four o'clock in the afternoon. The child should pass water just before retiring and if awake at any time during the night, should get up for that

purpose. The child should not be too warmly covered, and if possible should not sleep on the back.

Male infants should be examined for adherent foreskin, or phimosis, and if found should have circumcision performed. Phimosis is often a cause of convulsions and St. Vitus' Dance.

#### LEUCORRHEA.

Leucorrhea, a discharge from the vagina, sometimes occurs in little girls, even in the first year of life. It may come from debility, injury, worms, or may denote an infection from unclean towels, diapers and a general lack of cleanliness. Bathing the parts with warm water to which may be added two teaspoonfuls of boracic acid to the pint, carefully dried, the parts dusted with baby powder, and covered with a piece of soft lint may relieve the irritation. A physician, however, should be consulted in all cases.

The acute, contagious and infectious diseases of childhood will not be considered in this pamphlet, for any child ill more than a few hours should be under the personal care of a physician. Much can be done, however, before the physician arrives, and in nearly all cases where there is high fever, a good plan is to first give a dose of castor oil or Dr. Pierce's Laxative for Children, a hot mustard foot bath under cover in bed, which will cause free perspiration, and occasionally sponging the body with cool or tepid water, or alcohol and water, equal parts. Wood alcohol should never be used. No solid foods should be given, nothing but milk or water until the advice of a physician is obtained. There should be an abundance of fresh air in the sleeping room, regardless of the temperature outside, as a child with fever will not take cold.

#### KISSING.

Never kiss a child upon the mouth. Tuberculosis, diphtheria and other diseases may be communicated in this way. If kissed at all, it should be upon the cheek or forehead.

Do not allow your child to drink out of a glass or cup used by another person unless you know positively the physical condition of that individual.

## DENTITION.

Dentition, or what is commonly called "teething," is a normal function, and, unless the gums are red and swollen, crying or fretting may be due to tight clothes, indigestion, scratching of a pin or thirst. It is sometimes necessary to take into consideration all the little ailments common to infants, making a thorough examination to find the cause of crying or any departure from the normal healthy standard. The cry of pain is strong and sharp, and usually accompanied by contraction of the features and drawing up of the legs. The cry of hunger or thirst is a continuous, fretful sound. The cry of sleepiness is also fretful. The cry of a sick child is feeble and whining. The cry of temper and indulgence is sudden, loud and strong, accompanied by kicking and stiffening of the body. With this cry, when baby gets what it wants, the crying stops. Crying when a part is touched or moved indicates the point where the trouble lies, and calls for further investigation, and perhaps treatment.

The two lower central teeth (incisors) appear first. The time varies from five to seven months. The teeth are usually later in making their appearance in bottle-fed babies than in those nursing at the breast, this, of course, depending upon the physical condition of both mother and babe. Usually, if the conditions are normal the nursing child is healthier than one fed on artificial food; consequently, the nursing infant usually has its first tooth at least a month in advance of the one "raised on a bottle." The baby's gums are at first a light pink and in appearance thin, but a short time before the teeth push through the gums become thick; the color of gums also changes slightly, becoming a darker pink than at first; if very red (bright red), we have a sign of inflammation. As the gums become harder, we notice the baby biting whatever reaches its mouth. If a teething-ring is used it should be washed frequently in boiling water, otherwise it may become a germ breeder.

The "milk teeth" are twenty in number. Beginning from the center, they are found in pairs. Those occupying the same

position in the upper and lower jaws have the same name. As previously stated the lower central incisors appear first, and later, usually in about three or four weeks, the upper central and lateral incisors make their appearance. At about the beginning of the second year, the two lower lateral incisors and four upper and lower anterior molars, will be discovered. There is always a pause between the cutting of each group of teeth, three to six weeks, according to the health of the infant. About the end of the second or the beginning of the third year the last group, four in number, complete the set. The milk teeth, which are only temporary, should receive the same care as the permanent teeth, and children's teeth should be cleansed with cheese cloth or a soft tooth-brush dipped in water which has been previously boiled and mixed with half a teaspoonful of bicarbonate of soda to a half cupful.

If the teething baby is receiving the food Nature intended, namely breast milk, many of the annoyances and ailments while cutting teeth may be prevented by keeping the mother's health in the best condition. The mother should be free from annoyances and her disposition cheerful. An emotional mother—one who has fits of anger, or one who meets with some great shock, such as sorrow—in fact, any condition which interferes with the cheerfulness of the mother poisons the milk to a greater or less extent, and may not only cause sickness in an infant, but place the little one's life in jeopardy.

### INFANT FEEDING.

The milk from a healthy mother is by far the best nourishment for an infant during the first year of its life and cannot be fully replaced by any other form of feeding. Some mothers, however, are not fitted for nursing and in such cases it may be necessary to resort to artificial foods. Cow's milk modified to suit age is the best substitute. Tables for modified milk to suit different ages of healthy infants can be found on another page,

In some cases it may be necessary to use some of the prepared foods which may be obtained at all drug stores, or even condensed milk for a time, but, in our opinion, none of them can take the place of mother's milk or modified cow's milk for an indefinite time.

In cases where it is necessary to resort to prepared foods, any of the following may be given a trial:

Allenbury's Milk Food No. 1 for use from birth until end of the third month.

Allenbury's Milk Food No. 2 for use from fourth until end of the sixth month, and,

Allenbury's Milk Food No. 3 for use from the fifth or sixth month and upwards.

Eskay's Food.

Horlick's Malted Milk.

Mellin's Food.

Nestle's Food may also be given a trial, especially in those cases where ordinary milk disagrees with the child.

An infant may be reared on artificial foods and remain healthy and grow strong, but the percentage of robust bottle-fed babies is much smaller than that of healthy breast-fed infants. This is particularly true of the poorer classes who often lack both the time and the intelligence required to rear a healthy infant by bottle-feeding.

The contra-indications to maternal nursing are, according to Dr. Holt, the celebrated specialist, as follows: If the mother has tuberculosis in any form, latent or active, she should not nurse her child. A tuberculous mother not only exposes her child to infection, but hastens the progress of the disease in herself. If the mother has consumption nursing is almost certain to prove fatal to her.

When the mother has any serious diseases, such as Bright's Disease, convulsions or blood poisoning, during pregnancy or thereafter, she should not be allowed to nurse her infant. If she has St. Vitus's Dance or Epilepsy, nursing is contra-indicated. If she is very feeble or has any serious chronic disease,

the child will derive little benefit from breast-feeding and the mother will be greatly injured. Good artificial feeding is, of course, to be preferred to poor breast-feeding.

A breast-fed child in the worst surroundings has a better prospect so far as health is concerned, is less apt to become ill, than an infant under any condition of substitute feeding.

The breast milk from a healthy mother is rich in fat, containing 4 to 5 percent., together with 7 percent. of milk sugar and 1.25 percent. of proteid; and other things being equal, the fatter the child, the healthier it is. The child receives from mother's milk over and above that from artificially prepared foods the extra amount of fat which is necessary for the growing infant. This fat is necessary for the maintenance of its requisite heat. The heat of the body is largely lost by radiation and evaporation from the surface, and the child having about three times as much surface for radiation and evaporation as the adult, relatively speaking, the importance of maintaining the fat contents of its food is at once seen. The extra amount of fat is also needed for the child's nutrition on account of rapid growth of brain, nerves and bone marrow, all of which tissues contain a large amount of fat.

The infant's stomach rapidly enlarges, and where it is necessary to give artificial foods, the child is better adapted physically to such foods after the sixth or eighth week; in other words, can better digest properly modified cow's milk than earlier in infancy.

It is not only necessary or advisable for the welfare of the infant to receive mother's milk, but it is also best for the health of the mother, provided she is well, that the child should nurse.

The womb receives a certain amount of reflex stimulation to contraction from eight to ten times every twenty-four hours and is nature's way, or help in restoring the generative organs to a normal condition.

After the infant has nursed to its fill, it should be placed in a quiet, partly darkened room where it may sleep until it is again ready to nurse.

## WEANING.

The average period of nursing is one year. The mother's milk usually begins to fall off in quality and quantity after the seventh or eighth month. The abundance and duration vary in different cases, according to the health and vigor of the woman. In normal conditions the quantity and quality increase for the first five or six months proportionately to the needs of the child's nutrition. In women who do not nurse, the secretions rapidly decline and soon cease altogether.

Under ordinary circumstances the baby should be weaned from the tenth to the twelfth month; but there is no ironclad rule to govern all cases. If an infant should be ten months or one year old at the beginning of summer, its mother healthy in every particular, furnishing abundance of milk which apparently furnishes ample nutrition, we would not advise weaning an infant at such a time. Neither would we advise weaning an infant during the summer months, especially if teething. If, however, the mother's health is failing, or if she has any disease, the child should be weaned at once, otherwise mother and infant will suffer. The process of weaning baby should be gradual, first, giving the little one food from bottle once daily, the balance of the time nursing at regular feeding time, and gradually increasing the number of bottle feedings, substituting the bottle for the breast and within a short time nursing may be stopped entirely.

If prepared infant foods are used one food may be entirely satisfactory in one case but not in another, therefore it is sometimes necessary to try several in order to find one that suits the baby.

If baby is bottle-fed never allow it to suck an empty bottle. The baby should be placed in the arms for nursing in the same position as if nursing at the breast. If the bottle is held in the hand it should be changed so that the neck of the bottle is always full. It may be necessary at times to remove the bottle from the mouth to admit air into the bottle.

In selecting a bottle get one with a large neck, or better still an open, wide-mouth cell. The cell can be filled without a funnel and cleaned without brush; the interior can be wiped out with a towel the same as a drinking glass. The other portion of the bottle is not a nipple, but a breast; it is rubber, consequently yielding and collapsable. Another good article is the Handy Nurser. This is a wide-necked bottle, with a pure rubber anti-colic nipple and brush. Never use a bottle with a rubber tube. After each nursing



CELL AND  
BREAST.

the bottle should be washed in boiling water to which has been added bicarbonate of soda or saleratus. The breast or nipple of the bottle should be thoroughly washed in the same manner. We would advise that two bottles be purchased, as it is hardly safe to rely entirely upon one. The bottle should be thoroughly washed not only after feeding, but immediately before. Nearly all druggists keep these nursing bottles in stock.

In Dr. Starr's "Hygiene of the Nursery," he states the change in the manner of feeding may be accomplished gradually or suddenly. In gradual weaning about four weeks are required to prepare for the absolute withdrawal of the breast. For infants, if suck be given every three hours from five A. M. until eleven P. M., or seven times a day, there should be during the first week of preparation one artificial feeding and six nursings daily. During the second, two and five. During the third, four and three. During the fourth, six and one. Then the breast must be entirely withheld.

Carefully prepared milk food administered from a bottle is



HANDY NURSER AND  
BRUSH.

the best substitute. At the age of ten months, a mixture that ordinarily agrees well is:

Cream,	1 tablespoonful.
Milk,	8 tablespoonfuls.
Sugar of Milk,	1 teaspoonful.
Water,	3 tablespoonfuls.

This is to be poured into a perfectly clean bottle, warmed in a water-bath and taken through a clean, plain rubber tip. Should the quantity of six fluid ounces be insufficient to satisfy the child's appetite, all the ingredients except the cream may be increased until the mixture measures eight or even twelve fluid ounces, according to the demand. When fever, disordered digestion with vomiting and diarrhea, or the actual cutting of one or more teeth occur during the period of preparation, the number of artificial feedings must be reduced, or the breast resumed until the disturbance be passed. Then the course may be begun again and carried to its completion.

When the baby is one year old, we can usually increase the diet by the use of some cereal, such as oatmeal, which has been cooked for two or three hours in a double boiler. Then may be added a soft-boiled egg (boiled one minute), or a poached egg, and a little stale bread which may be thinly buttered or soaked in gravy containing no fat, or in beef juice. Milk may be given in a glass; also, The "Allenbury's" Malted Food "No. 3," Horlick's Malted Milk, Mellin's Food. But this additional feeding should be gradual. Many times it is not well to give babies food in solid form until the eighteenth or twentieth month, but if a baby is allowed a small amount at the age of one year the diet may be increased gradually and by the time it is eighteen months old it may be fed well-baked potatoes, broths with rice or barley, and the white meat of chicken or rare roast beef, or beefsteak, rare—all of which should be well minced. A child at that age should have five meals a day. All cereals should be thoroughly cooked. Bread should be well baked. The principal meal should be at midday. The child should never be given indigestible, highly seasoned or made-over dishes. Fruits are excellent with the exception of bananas, which should seldom be given. As the child grows older the diet is gradually increased, so that at the age of three or four it partakes of the

same foods as an adult. When the child is sick, the diet should be left entirely to the family physician who can give all the information necessary regarding special and proper foods.

THE FOLLOWING INFORMATION AND TABLES OF MODIFIED MILK ARE TAKEN FROM DR. STARR'S "HYGIENE OF THE NURSERY."

Thickening substances—attenuants, such as barley-water, gelatine, or one of the digestible prepared foods, act purely mechanically by getting, as it were, between the particles of caseine during coagulation, preventing their running together and forming a large, compact mass.

When an "infant's food" is used to act mechanically, care should be taken to select one in which all the starch has been converted into maltose and dextrine by the Liebig process. The articles known as "Mellin's Food" and "Horlick's Food" can be relied upon. One teaspoonful of either dissolved in a table-spoonful of hot water and added to each portion of food makes a very easily digested mixture.

For the successful management of children the mother or nurse must not only be familiar with the theory of feeding, but must practically understand the methods of preparing food. To this end a schedule of the diet of an infant from birth upward, with a sketch of modifications that have to be made most frequently, will serve as a useful guide.

*Diet during the first week:—*

Cream,	2	teaspoonfuls.
Whey,	3	teaspoonfuls.
Water (hot),	3	teaspoonfuls.
Milk Sugar,	$\frac{1}{2}$	teaspoonful.

For each portion; to be given every two hours from 5 A. M. to 11 P. M., and in some cases once or twice at night; amounting to twelve fluid ounces of food per diem.

*Diet from the second to sixth week:—*

Milk,	1	tablespoonful.
Cream,	2	teaspoonfuls.
Milk Sugar,	$\frac{1}{2}$	teaspoonful.
Water,	2	tablespoonfuls.

For one portion; to be given every two hours, from 5 A.M. to 11 P. M.; amounting to seventeen fluid ounces of food per diem.

*Diet from sixth week to the end of the second month:—*

Milk,	2½	tablespoonfuls.
Cream,	1	tablespoonful.
Milk Sugar,	½	teaspoonful.
Water,	2½	tablespoonfuls.

For each portion; to be given every two hours; amounting to thirty fluid ounces per diem.

*Diet from the beginning of the third month to the sixth month:—*

Milk,	5	tablespoonfuls.
Cream,	1	tablespoonful.
Milk Sugar,	1	teaspoonful.
Water,	2	tablespoonfuls.

For each portion; to be given every two and a half hours, or thirty-two fluid ounces per diem.

*Diet during the sixth month; six meals daily, from 7 or 8 A. M. to 9 or 10 P. M. Equivalent to thirty-six fluid ounces of food each day:—*

Milk,	8	tablespoonfuls.
Cream,	1	tablespoonful.
Milk Sugar,	1	teaspoonful.
Hot Water,	3	tablespoonfuls.

*Diet during the seventh month, six meals daily; amounting to thirty-nine fluid ounces of food per diem:—*

Milk,	9	tablespoonfuls.
Cream,	1	tablespoonful.
Milk Sugar,	1	teaspoonful.
Water,	3	tablespoonfuls.

Throughout the eight and ninth months five meals a day will be sufficient. First meal at 7 A. M.:—

Milk,	12	tablespoonfuls.
Cream,	1	tablespoonful.
Milk Sugar,	1	teaspoonful.
Water,	3	tablespoonfuls.

Second meal at 10.30 P. M. Milk, cream and water in the same proportion; Mellin's Food, two teaspoonfuls. The food is

first dissolved in the water which must be hot, add this with stirring to the previously mixed milk and cream.

Third meal at 2 P. M.—same as second.

Fourth meal at 6 P. M.—same as second.

Fifth meal at 10 P. M.—same as first.

This gives forty fluid ounces of food per diem.

Instead of Mellin's Food, a teaspoonful of flour-ball may be added.

Two meals of flour-ball daily—the second and fourth—are all that can be digested. To prepare these, rub one teaspoonful of the powder with a tablespoonful of milk into a smooth paste, then add a second tablespoonful of milk, constantly rubbing until a cream-like mixture is obtained. Pour this into eight ounces of hot milk, stirring well, and it is then ready for use. The other meals should be composed of milk, cream, sugar of milk and water as already given.

Mellin's Food and flour-ball may be substituted by oatmeal or barley, or any one of the infants' foods in which the starch has been converted, by Liebig's process, into maltose and dextrine.

*Diet from the tenth month to fourteenth month, five meals daily:—*

Milk,	15 tablespoonfuls.
Cream,	1 tablespoonful.
Mellin's Food,	1 tablespoonful.
(Or flour-bar-	
ley jelly),	2 teaspoonfuls.
Water,	3 tablespoonfuls.

Occasionally, about the end of the first year, a child may require a more varied and substantial diet; for example:—

First meal, 7 A. M.—Milk mixture as above.

Second meal, 10.30 A. M.—A breakfast-cupful of warm milk (eight fluid ounces).

Third meal, 2 P. M.—The yolk of an egg lightly boiled, with stale bread crumbs.

Fourth meal, 6 P. M.—same as first.

Fifth meal, 10 P. M.—same as second.

On alternate days the third meal may consist of a teacupful (six fluid ounces) of beef, mutton, or chicken broth, containing a few stale bread crumbs.

As much more difficulty is experienced in feeding infants during the first twelve months than during the second, it would be well to pause here to consider what had best be done in case the food described should disagree.

If, after feeding, vomiting occurs, with the expulsion of large, firm clots of caseine, the effect of adding the lime water or barley water must be tried.

*For instance, at the age of six weeks make each bottle of:—*

Milk,	2½	tablespoonfuls.
Cream,	1	tablespoonful.
Milk Sugar,	½	teaspoonful.
Lime water,	2½	tablespoonfuls.

*Or of:—*

Milk,	2½	tablespoonfuls.
Cream,	1	tablespoonful.
Milk Sugar,	½	teaspoonful.
Barley water,	2½	tablespoonfuls.

Sometimes, particularly if there be diarrhea, boiling makes the milk more tolerable, and in this condition it may be used instead of fresh milk in either of the above mixtures. Condensed milk, too, can be employed temporarily, making each portion of:—

Condensed milk,	1	teaspoonful.
Cream,	1	tablespoonful.
Hot water,	5	tablespoonfuls.

Sometimes milk in any form, however carefully prepared, ferments soon after being swallowed and excites vomiting, or causes great flatulence and discomfort, while it affords little nourishment. With these cases the best plan is to withhold milk entirely for a time and try some other form of food.

The following are good substitutes:

Mellin's Food,	1	teaspoonful.
Hot water,	6	tablespoonfuls.

*For each portion; to be given every two hours at the age of six weeks:—*

Veal broth ( $\frac{1}{2}$ lb. of	
meat to the pint),	3 tablespoonfuls.
Barley water,	3 tablespoonfuls.

*For one portion:—*

Whey,	3 tablespoonfuls.
Barley water,	3 tablespoonfuls.
Milk Sugar,	$\frac{1}{2}$ teaspoonful.

A teaspoonful of the juice of raw beef every two hours will usually be retained when everything else is rejected.

Such foods are only to be used temporarily until the tendency to fermentation within the alimentary canal ceases; then milk may be gradually and cautiously resumed.

When infants approaching the end of the first year become affected with indigestion, it is often sufficient to reduce the strength and quantity of the food to a point compatible with digestive powers. For instance, at eight months the food may be reduced to that proper for a healthy child at six months, or even less. Here, too, predigestion of the food is very serviceable.

THE FOLLOWING DIET-TABLES (FROM GRIFFITH—"THE CARE OF THE BABY") ARE INTENDED FOR THE AVERAGE HEALTHY CHILD.

As a guide for the feeding of a child of from twelve to eighteen months the following diet-list may be of service. The numbered menus indicate the choice that the mother may have, varying them so that the child will not tire of any.

*Diet from one year to eighteen months:—*

Breakfast, 6 to 7 A. M.—(1) Eight to 10 ounces of milk with stale bread broken in it. (2) Two to three tablespoonfuls of well-cooked porridge of oatmeal, arrowroot, wheaten grits, hominy grits, farina, etc., or one of the numerous good breakfast foods on the market, with 8 to 10 ounces of milk poured over it. (3) A soft-boiled or poached egg with bread broken in it, and a cup of milk.

Second meal, 10 A. M.—Eight to 10 ounces of milk from a cup or bottle.

Dinner, 1.30 to 2 P. M.—(1) Bread moistened with dish-gravy (no fat), beef-tea, or beef juice, 1 to 2 ounces; a cup of milk. (2) Rice or grits moistened in the same way; a cup of milk. (3) A soft-boiled egg and stale bread thinly buttered; a cup of milk. Sago, tapioca or rice pudding (no raisins), cornstarch or junket in small quantities as dessert with any of these diets.

Fourth meal, 5 to 6 P. M.—A cup of milk or some bread and milk.

Fifth meal, 9 to 10 P. M.—A cup or bottle of milk.

It is, of course, understood that the baby does not suddenly plunge into any such diet at twelve months, but that the list and the variety are only very gradually increased and that milk remains the principal article of diet.

*Diet from eighteen months to two years.*

Breakfast, 7 A. M.—(1) Eight to 10 ounces of milk with a slice of bread and butter or a soda, Graham, oatmeal or similar unsweetened biscuit. (2) A soft-boiled or poached egg with bread and butter and a cup of milk. (3) Porridge as described in the previous list.

Second meal, 10 A. M.—(1) Bread broken in milk. (2) Bread and butter or a soda or other biscuit with a cup of milk.

Dinner, 2 P. M.—(1) Boiled rice or a baked potato mashed and moistened with dish-gravy or beef-juice, 2 to 3 ounces; a glass of milk. (2) Six to 8 ounces of mutton or chicken broth with barley or rice in it; some bread and butter, zwieback or toast, and some cornstarch, custard, sago or rice pudding made with milk. (3) One-half to one tablespoonful of minced white meat of chicken or turkey, or minced rare roast-beef, beefsteak, lamb, mutton, or fish; bread and butter; a cup of milk.

Fourth meal, 5 to 6 P. M.—(1) Bread and milk. (2) Bread and butter and a cup of milk. (3) Two to three tablespoonfuls of a cereal porridge with 8 to 10 ounces of milk.

*Diet from two to three years:—*

Breakfast, 7 to 8 A. M.—(1) A small portion of beef-steak, with two to three tablespoonfuls of farina, oatmeal, hominy grits, wheaten grits, cornmeal, or other cereal porridge with plenty of milk or with 2 to 4 ounces of thin cream. (2) A soft-boiled or poached egg, bread and butter, and a cup of milk.

Second meal, 11 A. M.—(1) A cup of milk with bread and butter, or with a soda or other biscuit. (2) Bread and milk. (3) Six to 8 ounces of chicken or mutton broth.

Dinner, 2 P. M.—Roasted fowl, mutton, or beef cut fine; mashed baked potato with butter or dish-gravy on it; bread and butter; rice; macaroni. With more caution, trial can be made of asparagus tips, peas, spinach, and string beans. As dessert, tapioca, sago, or rice pudding, junket, or some of the fruits mentioned.

Supper, 6 P. M.—(1) Bread and butter. (2) Milk with soda or similar biscuit, or with bread and butter. (3) Three to four tablespoonfuls of a cereal porridge with 8 or more ounces of milk.

*Foods permitted at from three to six years:—*

**Meats.**—Broiled beef-steak, lamb chops and chicken; broiled liver; roasted or broiled beef, mutton, lamb, chicken and turkey; broiled or boiled fish; raw or stewed oysters.

**Eggs.**—Soft-boiled, poached, scrambled, omelette.

**Cereals.**—Light and not too fresh wheaten and Graham bread, toast, zwieback; plain unsweetened biscuit, as oatmeal, Graham, soda, water, etc.; hominy grits, wheaten grits, corn meal, barley, rice, oatmeal, macaroni, etc.

**Soups.**—Plain soup and broth of nearly any kind.

**Vegetables.**—White potatoes, boiled onions, spinach, peas, asparagus, except the hard parts, string and other beans, salsify, lettuce, stewed celery, young beets, arrowroot, tapioca, sago, etc.

**Fruits.**—Nearly all, if stewed and sweetened; of raw fruits, peaches are one of the best; pears; well-ripened and

fresh raspberries, blackberries, grapes without the skin and seeds; oranges without the rind.

**Desserts.**—Light puddings, as rice pudding without raisins, bread pudding, etc., plain custards, wine jelly, junket, and occasionally ice cream.

#### FOODS TO BE TAKEN WITH CONSIDERABLE CAUTION.

Kidney, oysters, duck, muffins, hot rolls, sweet potatoes, baked beans, squash, turnips, parsnips, carrots, egg-plant, stewed tomatoes, green corn, cherries, plums, raw apples, strawberries, gooseberries, currants.

#### FOODS TO BE AVOIDED.

Fried foods of any kind, griddle cakes, pork, sausage, ham, goose, veal, corned beef, salt fish, highly seasoned food, pastry, all heavy, doughy, or very sweet puddings; unripe, sour or wilted fruit; bananas, pineapples, cucumbers, radishes, raw celery, raw tomatoes, cabbage, cauliflower, nuts, candies, sweet cakes, preserved fruits, jams, tea, coffee, alcoholic beverages.

#### SAMPLE PAMPHLET OF INFORMATION FOR DISTRIBUTION IN SUMMER.

*Friedenwald & Ruhrah.*

#### “DIET IN HEALTH AND DISEASE.”

Nurse the baby; mother's milk is the best of all foods.

Do not wean the baby in hot weather.

Remember that ten bottle-babies die to one that is breast-fed.

One-third of the deaths of infants and young children occur during the hot summer months.

Heat kills the baby chiefly by spoiling the milk given it.

Nurse the baby regularly, not oftener than two hours during the day and four hours at night.

Do not nurse the baby every time it cries.

If you cannot nurse your baby, consult your doctor before giving it the bottle.

**Fresh Air.**—Give the baby fresh air day and night.

Keep the windows open all day and all night.

Keep the baby out of doors as much as you can.

The out-door air is better for the baby than that of the house.

The air in the squares and parks is better than that of the streets.

Keep the rooms clean.

Do not let garbage, slop, or dirty clothes stand about the room.

**Sleep.**—Do not let the baby sleep in the same bed with any other person.

Keep the baby quiet and let it sleep as much as it will.

Do not handle the baby too much, let it alone.

**Bathing.**—Bathe the baby every day.

In very hot weather sponge the baby several times a day to keep it clean and cool.

Wash the baby whenever the diapers are changed.

**Clothing.**—The baby feels the heat as much or more than you. •

In hot weather take off most of the baby's clothing.

If it becomes cool, the clothing can easily be put back.

If the baby has fever, take some of the clothing off, but do not put more on. A baby with fever will not catch cold.

**Diapers.**—Wash the diaper as soon as it is soiled and dry in the open air.

Do not use a diaper a second time before washing it.

**Water.**—In hot weather the baby needs a little more water and not so much food.

Give a few teaspoonfuls of pure boiled water several times a day.

Summer diarrhea is caused by spoiled milk or other food, bad air, dirt, and too much clothing, too much handling, too little sleep, too little water.

If the baby vomits or has loose bowels, *stop all food* and give plain boiled water until you have seen your doctor.

Do not drug the baby. If your baby is sick send for a doctor, or take it to a hospital or dispensary.

Do not ask your neighbor's advice about your baby, ask your doctor.

## THE BOTTLE-FED BABY.

**The Bottles.**—Use a common round-bottomed bottle; boil or scald it each time before putting the baby's milk in it.

**The Nipples.**—Use plain black rubber nipples. Boil them once a day. Wash the nipples before and after each feeding. When not in use keep the nipples in a covered glass filled with water in which you have put a pinch of baking soda or borax.

Never use a nipple with a tube to it.

**The Milk.**—Get only the best milk for the baby. Better pay more for milk and save doctor bills, and possibly funeral expenses. It costs less to buy a baby good milk for a year than to bury it.

The best milk is bottled at the dairy and delivered in bottles. Milk sold from the can is apt to be dirty and unfit for use. Milk in summer from an open can in a shop is never fit to give a baby.

Milk from a herd is better than milk from one cow.

**To Keep Milk.**—Take it in as soon as delivered. As soon as possible mix the baby's milk. Place this in clean bottles and stopper with raw cotton.

Keep the milk cold—on ice if possible. If you have no ice, wrap a cloth wrung out in cold water about the bottles.

If you have difficulty in keeping milk, bring it to a boil as soon as it is delivered to you.

Keep the things for the baby's milk separate.

Keep the things clean.

Scald with boiling water before using.

Milk will spoil	{	If it is not kept cold. If it is not kept covered. If it is dirty. If it has been put in dirty bottles or cans. If it is measured in dirty cans. If it gets dust in it.
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## OATMEAL, BARLEY OR RICE WATER.

Barley water is perhaps the one most frequently used and is employed to prevent the formation of large compact curds in milk for a bottle-fed baby.

In making any of the above take two tablespoonfuls of the grain, oatmeal, barley or rice, to which may be added a quart of water. This should be soaked over night, or for a few hours at least, but if in urgent need of same, the soaking may be dispensed with and the grain boiled five minutes. If soaked over night, the water in which the grain soaked should be poured off and fresh water added before cooking. Boil for several hours, add water in sufficient quantity from time to time to keep the quantity up to a quart, strain. This makes a thin watery gruel.

There are many prepared flours on the market and one of the best is Robinson's Barley Flour. Your grocer or druggist can order it, if not in stock; directions with each can. The usual method is from a dessert to a tablespoonful of the flour added to a pint of boiling water, boil fifteen to thirty minutes, strain. No previous soaking required.

## HOW TO MAKE BEEF-JUICE.

Take one pound of round or tenderloin steak, free from fat. Cut into small pieces, season with a very little salt and broil slightly in a spider. The steak may be broiled in one or two large pieces, but should not be thoroughly cooked. It must be rare in order to get the right kind of beef-juice. After broiling, the steak may be cut into smaller pieces and the juice expressed with a meat press which may be purchased at nearly any hardware store. A lemon squeezer will answer the purpose if the other cannot be obtained. One pound of beef should give from two to four ounces of beef-juice.

## LIME WATER.

If lime water is to be used for considerable time in the preparation of modified milk, it is quite an expense, therefore, may be made as follows:

Get a piece of unslacked lime about the size of an egg. Put this in one gallon of water in an earthen vessel, stir and allow it to settle. Pour off the first water and add fresh. Cover it to exclude dust. Use only from the top. Add water as fast as it is consumed, stir thoroughly, and allow it to settle before using again.

A smaller quantity of lime water than the above formula calls for can be made by adding a piece of unslacked lime the size of a walnut to one-half gallon of pure water.

Remember to use an earthen vessel and do not permit any unslacked lime to remain in the house where it may become wet, otherwise fire may result.

In modifying milk it is often necessary to use lime water in place of plain water to prevent curd (clotting) in the stool, diarrhea, etc. It is necessary to add more than a teaspoonful of lime water to the bottle, and to obtain desired results one-third part of the milk mixture must be lime water.

If lime water cannot be obtained a small pinch of bicarbonate of soda or salaratus may be added to each bottle.

Milk of Magnesia (Phillips'), five to fifteen drops, may be added to each feeding in place of lime water or bicarbonate of soda, and is preferable where a slight laxative effect is desired. If digestion is perfect, one-third of the extire mixture for each feeding may be plain water, previously boiled and cooled. Barley water, the formula of which may be found on another page, may be used for diluting or modifying cow's milk as a substitute for lime water, milk of magnesia, soda, or plain water.

## OBSTETRICAL TABLE

Jan...	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Oct...	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7
Feb...	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28			
Nov...	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	1	2	3	4	5			
Mar...	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Dec...	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	23	24	25	26	27	28	29	30	1	2	3	4	5		
Jan...	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
April	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	
Jan...	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
May...	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	1	2	3	4	5	6	7
Feb...	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
June...	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	
Mar...	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
July...	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	1	2	3	4	5	6	7
April...	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Aug...	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7
May...	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
June...	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7
Sept...	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
June...	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	1	2	3	4	5	6	7	
Oct...	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
July...	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7
Aug...	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
Nov...	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	
Dec...	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Sept...	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	1	2	3	4	5	6	7

As the normal term of pregnancy is about 10 lunar months or about 280 days, this table has been devised to show at a glance the beginning and end of every 280 day period throughout the year. Find the date of the last menstruation on the upper line of the horizontal row and the figure below with the indicated month, will be the 280th day.

## CHAPTER XIV

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### Woman and Her Diseases.

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The fear of pain and the dangers of childbirth fill many a woman's breast with dismay. In the olden days of leeches and witchcraft, it was considered sacrilegious to lessen the pains of labor. Latterly, anæsthetics have been used at the time of parturition, and now people are beginning to find out that pain and danger can be almost wholly avoided.

Proper preparation during gestation will make both as rare as they used to be common. There is no reason why childbirth should be fraught with danger and distress. It is a perfectly natural function, and should be performed in a natural way without undue suffering. Nature never intended that women should be tortured when doing the one thing which makes them wholly womanly. The perversion of nature's laws has brought this suffering about, and a return to right living will stop it.

Nine out of ten women are troubled more or less by weakness and diseases peculiar to their sex. It is so because they do not take proper care of themselves—because they neglect little ills and little precautions. A woman in perfectly hearty health goes through her time of trial with comparative ease. The thing to do then, is to make all pregnant women healthy—to strengthen them generally and locally. The medicine and tonic to do it with is Dr. Pierce's Favorite Prescription.

It is a powerful invigorant and nervine. It soothes and strengthens the nerves and acts directly on the feminine organism in a way which fits it for the proper and regular performance of all its functions at all times.

Taken during gestation it robs childbirth of its dangers to both mother and child, by preparing the system for delivery, thereby shortening labor, lessening pain and abbreviating the period of confinement. The Favorite Prescription also promotes the secretion of an abundance of nourishment for the child, if taken after confinement, besides building up the mother's strength and making her recovery more perfect.

## ABORTION. (MISCARRIAGE.)

The term *abortion* is used to denote the premature expulsion of the fœtus. If the expulsion takes place within four months after impregnation, it is termed *abortion*; if between the fourth and seventh month, *miscarriage*; if after the seventh month, but before the completion of the full period of gestation, *premature labor*.

Abortion may be due to those agents which act directly upon the uterus and cause the expulsion of the fœtus; to those which occasion the death of the fœtus, thereby effecting its ejection; and it may be *criminal*, that is, produced intentionally by direct agencies intended for that purpose.

**Symptoms.** The premonitory symptoms are pain in the loins and lower part of the back, a dull pain in the abdomen and thighs, nausea, chills, and palpitation. The membranes and blood-vessels of the uterus become lacerated, causing profuse hemorrhage. The discharge of blood from the vagina is sometimes attended with excessive pain.

**The Causes** which act directly upon the uterus to produce abortion may be violent exercise, lifting, accidents, or injuries from blows or falls. Nervous susceptibilities, a plethoric condition of the system, anæmia, exhaustive discharges, use of improper food, uterine displacements, congestion caused by excessive sexual excitement, general debility or muscular irritability, which is sometimes so great as to produce contractility of the uterus before the term of pregnancy is completed, inflammation of the cervix, ulcerations of the uterus, or any previously existing disease may produce abortion. When it has once taken place, it is apt to recur at about the same time in subsequent pregnancies.

The death of the fœtus may be occasioned by a diseased condition of the embryo, amnion, or placenta, and also by convulsions or peritoneal inflammation.

**Criminal Abortion** is secretly practised by women who desire to rid themselves of the evidence of immorality, and by those in wedlock who wish to avoid the care and responsibility of rearing offspring. Statistics show that it is very prevalent, undermining the health of women and corrupting the morals of society. We cannot pass over this subject in silence. Those who frustrate the processes of nature by violating the laws of life incur just penalties. All the functions of life and body are vitally concerned in reproduction. Any infraction of the Divine law, "Thou shalt not kill," is inevitably followed by punishment. The obligations to nature cannot be evaded without inevitable

penal effects. Furthermore, all such transgressors carry with them the consciousness of guilt and the feeling of secret woe.

"O God ! that horrid, horrid dream  
Besets me now awake !  
Again, again, with dizzy brain,  
The human life I take,  
And my red right hand grows raging hot,  
Like Cranmer's at the stake."—Hood.

What shall we say concerning abortionists, men and women who are willing to engage in the murder of innocents for pay? True, there may be circumstances in which it is not right to continue in the pregnant condition, such as when the children of an unfortunate marriage are idiots, or the pelvis of the woman is so deformed that she cannot bear a living child. All such cases should be submitted to the *family* physician, who ought to be made acquainted with all the circumstances and facts relating to the case, when he can summon other physicians for counsel, and their deliberations may determine the propriety or necessity of bringing on an abortion.

Parties have written to us and others have made personal application under circumstances when it might have been right for their *family physician* to have induced abortion. We wish to have it distinctly understood that we will not under any circumstances prescribe medicines or perform any operation to relieve women of pregnancy.

Mechanical means are resorted to by abortionists, and many women produce abortion upon themselves. It always terminates in lasting injury and sometimes in speedy death. Certain medicines will sometimes produce abortion but they are very unsafe. An opinion is very prevalent that if abortion be produced before the movements of the fœtus are felt, there is no crime committed. It should be remembered that *life begins with conception*, and, at whatever period of pregnancy abortion is committed, *life is destroyed*. Whoever disobeys the Divine injunction cannot escape his own consciousness of the deed, and the anguish and bitter remorse which ever after disturb the soul.

**Treatment.** In threatening abortion, there is pain in the back or lower part of the abdomen, and later some flow of blood. The first object is to obtain perfect rest and quiet, and assume the recumbent position. By lying down, the blood will be more easily diverted to the surface of the body. Gallic acid, in doses of five grains every two or three hours, is often a valuable agent to arrest the hemorrhage, but opium in some form should be relied upon principally. A Dover's powder, ten grains, may be administered, to assist in determining the blood to the surface and extremities of the body and to allay irritation. The room should be cool, the patient should lie on a hard bed, and all company should be avoided, for excitement favors abortion. If the flow of blood equals a gill in amount, there is little hope of preventing abortion, and the case should be entrusted to a physician.

## OVARIAN AND UTERINE TUMORS.

**Ovarian Tumors** generally consist of one or more cysts or sacs, developed within the ovary, and filled with a fluid, or semi-fluid matter, which is formed in their interior. The cysts vary in size, in some instances being not larger than a pea, while in others they are capable of containing many quarts of fluid. In one case operated upon at the Invalids' Hotel and Surgical Institute, thirty-five pints of fluid were taken from three cysts.

The effect of ovarian tumors on the duration of life is shown by the statistic of Stafford Lee. Of 123 cases, nearly a third died within a year, more than one-half within two years from the first development of reliable symptoms, while only seventeen lived for nine years or upwards.

**Fibroid Tumors** of the uterus are composed of fibrous tissue, identical in structure with that of the uterine walls. They are met with in all sizes, from that of a small shot to that of a mass capable of filling the entire cavity of the abdomen. Cases are on record in which these tumors have attained the weight of seventy pounds. They generally terminate life by prostration and debility produced by pressure on one or more of the organs essential to life; or by anæmia and debility, following severe hemorrhages.

**Polypi or Polypoid Tumors** of the uterus are of three kinds: cystic, mucous and fibrous. They vary greatly in size, sometimes being as large as a tea-cup; and their point of attachment may be extensive or consist only of a small pedicle. The cystic and mucous varieties may spring from any portion of the mucous surface of the uterus, but they are more frequently met with growing from the mucous membrane lining the cervical canal, and pendent from the mouth of the womb, while the fibrous variety generally grows from the sub-mucous tissue at or near the fundus, or upper portion, of the uterus.

The most prominent symptoms of polypoid growths are hemorrhage (which is almost invariably present) leucorrhœa, pain, backache and a sense of weight and dragging in the pelvis.

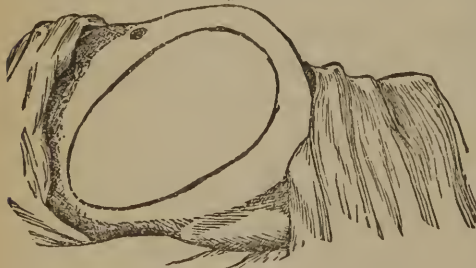
The best method of treatment, and, in fact, the only effectual one, is removal with the *écraseur*, polypus forceps, or galvano-cautery. The operation is usually attended with little or no pain.

**For more than thirty-five years** the physicians of the Invalids' Hotel and Surgical Institute in Buffalo, N. Y., have been successfully treating tumors by electrical and surgical means. We have found, after a long experience, that electricity as a cure for fibroid tumors is very successful in certain well-selected cases, and this method was advised and adopted many years ago by Apostoli, of Paris, and was taken up by a large portion of the medical profession. The plan, however, was more or less crude, and has been perfected by us to a point of efficiency in many cases. The frequent application of the electric current through the tumor destroys the fibrous cells, if applied early and after the improved methods which we adopt.

Although we successfully treat many cases in this way it is not suitable in all cases, and many conditions arise in connection with these growths which render operation absolutely essential for a complete cure. The operation when skilfully performed is one not to be dreaded as the results are universally successful. Our surgeons, after years of experience, have so perfected their methods that these cases are overcome, and most of them able to return home in good health after a stay of not to exceed twenty days, and at the most thirty days in the Sanitarium.

**CASE I.**—A married woman, aged 38. Had never given birth to a child. About four years before coming under our observation she discovered a small lump, as she expressed it, in the left ovarian region, which gradually increased in size until, when she consulted us, it caused considerable pain in the region of the liver from pressure, and interfered with respiration. Her general health was becoming much impaired. She stated that she had consulted a prominent gynecologist in this city, who had told her that the attachments of the tumor were so extensive that ovariectomy (removal with the knife) was out of the question, and that, therefore, he could only give her palliative treatment. This unfavorable prognosis only added mental anguish and despair to her physical suffering. On examination, we found a large multilocular cystic tumor, represented by Fig. 3, with very thick walls, extending from the left ovarian region obliquely upwards

Fig. 3.



The shape and position of the Tumor are shown by the dotted line.

and to the right, so that it pressed more upon the short ribs on the right side than it did upon the left, but which filled the entire cavity of the abdomen. The attachments, as the doctor whom she had previously consulted had stated, were so extensive that its removal with the knife could not be thought of. We were not disposed, however, to give the case up as hopeless. We told her that we would do what we could for her, but as to what the result of our treatment would be, we could not definitely say. She placed her case in our hands, and we resorted to the above described treatment. She was treated two and three times per week for more than two months, at the end of which time, the tumor had decreased in size fully two-thirds. It has ever since remained stationary, and has given her no trouble or inconvenience whatever. It is now seventeen years since we treated her.

**The very large Ovarian Tumors**, however, are not amenable to treatment by this process. The walls of their cysts become so thin and weak, while the pressure of the fluid from within is so great, that sudden and spontaneous rupture is liable to occur at any time and produce death. Removal by a cutting operation is necessary in such cases. Fortunately this procedure, as skilfully modified and perfected by experience, has, in the hands of our surgeons, proven free from the dangers and hazard common to Ovariectomy. This is due to skillful operation and to the fact that in our Institution the sanitary arrangements are as perfect as it is possible to make them. Everything is at hand in the way of instruments and appliances likely to be required, and the entire procedure is conducted upon the principles of perfect cleanliness and antisepsis, which obviate the risk of inflammation and blood-poisoning.

Furthermore, our nurses have had such training and experience that wants are anticipated, and details are looked after so vigilantly that the convalescence is rapid, as well as being comfortable and safe.

We invite correspondence by any one afflicted with troubles of this kind, and our surgeons will be very glad to answer any questions and give advice when requested to do so.

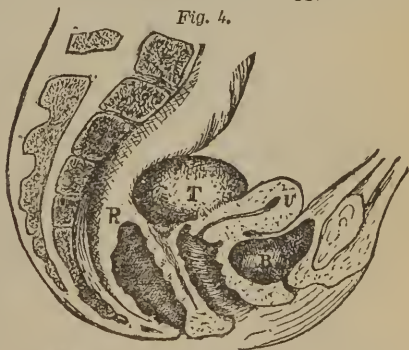
**Our surgeons have completed a long list of removals of Ovarian Tumors without a single death!**

We are, therefore, warranted in stating that

**The dangers due to the presence of these tumors are far greater than the slight risks of removal by the skillful methods employed by our surgeons.**

Owing to a change made in the anæsthetic used, the painful and persistent vomiting that often follows abdominal operations

**CASE II.**—A young lady of 23; unmarried. About six months previous to consulting us she discovered a tumor of about the size of an egg, in the region of the left ovary, which had been gradually increasing in size. On examination, we found the morbid growth to be about the size of a quart bowl, and evidently composed of several cysts with thick walls. She experienced no pain, and but slight inconvenience from its presence, but she was in great mental distress. She was an only daughter, and her mother had died a few years before from the shock and hemorrhage resulting from an operation for the removal of a large ovarian tumor, performed by the late lamented Dr. Peaslee, of New York. The same course was pursued in this case, and at the end of six weeks' treatment, the tumor was reduced to the size of an egg, and has remained so ever since, now more than thirteen years.



U, Uterus. B, Bladder. R, Rectum. T, Tumor.

is prevented. This does away with the greatest of all the dangers attendant upon the operation, and favors speedy recovery. Food is administered in the form of artificially digested and concentrated nourishment and is readily retained. The strength is thus rapidly restored, and the healing process hastened.

It is generally supposed that the size of the opening made through the abdominal walls is large, proportionate to the size of these tumors. This is an error. Even in the largest cystic tumors where the development is immense, only a small incision is made—simply sufficient to bring the walls of the tumor in view and admit, perhaps, two or three fingers. The tumor is then rapidly emptied of its contents by means of a powerful suction apparatus. Adhesions, if any exist, are then carefully broken up, and hemorrhage therefrom prevented; after which the

**CASE III.**—A woman, 37 years of age; married six years; no children. She had suffered for eight years from profuse menstruation and dysmenorrhea, with a membranous discharge, and, for several months before consulting us, she had experienced severe pain and a soreness in the pelvic organs. Her bowels were obstinately constipated, it being next to impossible for her to have an evacuation, and she possessed a pale and careworn countenance. Upon examination, we discovered a hard, incompressible tumor, represented in Fig. 2, attached to the posterior wall of the uterus, which caused anteversion of the womb, and which pressed upon the rectum so as to produce great obstruction. She was treated by means of electrolysis, with injections into the substance of the growth, for one month, at the end of which she returned home, with the tumor reduced from the size of a pint bowl to the size of an egg, and her health greatly improved. After going home the tumor continued to grow less until, at the end of a few months, her home physicians could detect no trace of it, and she has remained well since, for more than ten years.

Fig. 3.



U, Uterus. T. Tumor.

**CASE IV.**—A lady aged 36; married twelve years; no children. She complained of severe pain in the back and a frequent desire to urinate. Menstruation was profuse, and the bowels were constipated. On examination, we found an inter-mural fibroid tumor, represented in Fig. 3, developed in the anterior wall of the uterus, and pressing upon the bladder. The womb was enlarged, measuring three inches in depth, and was slightly anteverted. A month's treatment, with electrolysis and injections into the tumor, arrested the growth and diminished the size more than one-half, and caused the unpleasant symptoms to disappear.

**CASE V.**—A married lady, 26 years of age; had borne no children, but had had several abortions, brought about intentionally. Six months before consulting us, a tumor, about the size of an egg, was discovered by her home physician. It grew steadily from the time of its discovery until, when we made an examination, it was found to be about the size of an ordinary teacup. It was developed in the posterior wall of the womb, as represented in Fig. 4. Three weeks' treatment reduced the tumor two thirds,

large sac of the tumor, which when collapsed is like a thin bag, is readily drawn out through the small opening in the abdomen. The small pedicle or cord-like mass of vessels that supplies the tumor is then carefully treated after a plan devised and invented by ourselves, which effectually prevents any bleeding, and, at the same time, does not leave any irritating substance, such as burned and charred flesh, rubber, silk, or any other unabsorbable material, within the abdomen. The parts are left unbruised and without any poisonous germs in contact.

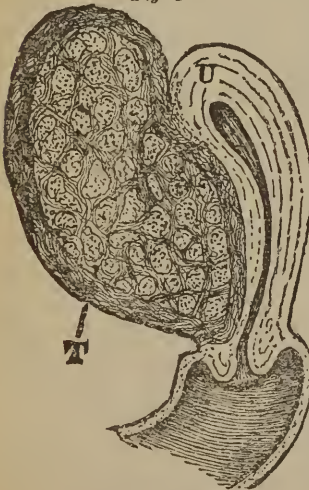
Our surgeons have met with phenomenal success in removing Ovarian Tumors, by the operation of Ovariectomy. Thus far, in a career extending over a long period of time embracing the removal of a long list of these morbid growths, they have not had a single fatal case.

A few of the many cases that have been under our care are herewith reported and illustrated. Each case is typical of a class.

**CASE VI.**—A widow lady, aged 52. She was examined ten years ago by two of the most distinguished physicians of New Haven, Conn., who pronounced her sufferings due to cancer of the uterus. She was then suffering from repeated hemorrhages, and other symptoms. They gave her palliative treatment, and told her that to interfere with

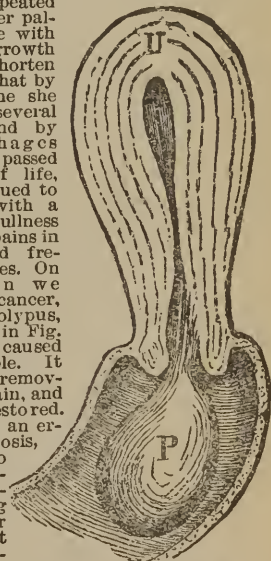
the morbid growth would only shorten her life, and that by leaving it alone she might live several years. By and by the hemorrhages ceased and she passed the change of life, but she continued to be troubled with a sensation of fullness in the pelvis, pains in the back, and frequent headaches. On examination we found not a cancer, but a large polypus, as represented in Fig. 5, which had caused all the trouble. It was quickly removed without pain, and her health restored. Thus, through an error of diagnosis, she was made to suffer physically and mentally for ten long years of her life, in constant dread of a horrible death.

Fig. 4.



U, Uterus. T, Tumor.

Fig. 5.



U, Uterus. P, Polypus.

# LACERATIONS

During labor the canal through which the head and shoulders must pass becomes greatly distended. At the commencement of childbirth the opening of the neck of the womb may be an inch or three inches in circumference. Later when a head three inches in diameter is passing the opening may be ten or twelve inches. At the lower opening the same stretching is necessary to permit the birth. If the parts are normal and elastic and the labor is natural there is nothing to fear for the parts soon return to their original form and condition. In cases, however, where the parts are inelastic, or the head is unusually large, or there is malformation of the mother, or malposition of the foetus, the neck of the womb may tear or the perineum may become lacerated, or both may be injured. If the perineum is lacerated it should be attended to immediately after delivery while the parts are still numb, for then the sides of the rent fit each other and no treatment other than stitching is necessary.

The late Dr. Emmet became famous through his discoveries of the benefits resulting from the proper treatment of these injuries. A few extracts from his writings will present the whole subject in a concise way to our readers:

“The lacerations or abrasions [from childbirth] may heal in the course of a short period, under the reparative process set up in the uterus after labor. On the other hand, under the influence of a general febrile condition, or of local inflammation, and often from the operation of causes which it is impossible to appreciate, these lesions, whether slight or severe, do not heal, and thus a confirmed inflammatory ulceration of the cervix uteri becomes established.

“As the laceration often occurs in consequence of rapid labor, or from the use of forceps and traction, the vaginal outlet is frequently left patulous. Owing to a want of the proper support, and to the enlargement of the uterus afterwards, prolapse must occur, and the organ sinks to the floor of the pelvis, when it frequently takes some degree of retroversion. The vagina cannot now regain its natural size, on account of the prolapse, and it becomes still more dilated as the uterus continues to advance like a wedge towards the vaginal outlet.

“So long as the cellulitis remains to any extent, the woman will complain of an inability to walk or stand with comfort; there will be a continual backache, with pains across the lower portions of the abdomen and down the limbs, and sometimes with irritability of the bladder. Menstruation will be profuse

at first, afterwards irregular, as to both time and quantity, and not seldom it will be absent for months. The leucorrhœal discharge will be profuse and constant, with the result, sooner or later, of establishing a profound anæmia, from the long-continued loss of the needed constituents of the blood. There is often an inability to concentrate the attention, and I have seen many instances where it was necessary to read over several times an ordinary newspaper paragraph before the subject could be understood. Headache, in some form, is seldom absent, but that situated at the back of the head, and particularly in the nape of the neck, is most common. The disposition becomes greatly changed for the worse, mountains are made from molehills, as the woman becomes irritable and fitful in temper. Insomnia is often a distressing symptom. The fits of depression become more frequent, while the constant dread of a loss of mind hangs with terror over many, to be realized in not a few instances by becoming inmates of a lunatic asylum.

“Until recently, this condition of laceration was universally mistaken for ulceration, and sometimes for the early stages of epithelioma, and for corroding ulcer of the uterus. To heal this ‘ulceration’ would long baffle every mode of treatment, or, if any improvement took place in the patient’s condition after a protracted rest in the recumbent position, a relapse would follow again and again, with every attempt at exercise. Such a case passed from one physician to another, until eventually the leucorrhœa ceased, and the profuse menstruation diminished as the surfaces, from the repeated application of caustics or the cautery, became cicatricial in character. Nevertheless, a woman in this condition gradually became a confirmed invalid, while the hypertrophy of the uterus remained, and from impairment of her general health the nervous element became most prominent.

“Eventually, when nature has been left to aid herself, the woman will frequently cease to menstruate at rather an early period in life, and will then gradually recover her health. Unfortunately, however, when the disease has existed so long as to induce a condition of profound anæmia, there remains no power in reserve to aid in bringing about a reaction and phthisis becomes developed. Then, again, a woman in robust health may be able so far to repair the damage as to give birth to a number of children after the injury. She will manage to hold her position in good health for years, notwithstanding frequent menstrual hemorrhages and a wasting leucorrhœa between the

pregnancies. But, finally, the change of life is completed, when epithelioma (cancer) may spring into existence from the seat of the old injury, as a product of perverted nutrition.

Dr. W. S. Playfair, states: "In regard to this difficulty, it is perhaps somewhat humiliating for us to admit that we have all been misunderstanding these cases, and it is not very easy to convince sceptics of the fact who have not accustomed themselves to the only method of examination by which it can be appreciated.

"The importance of this injury cannot be exaggerated, since at least one-half of the ailments among those who have borne children are to be attributed to laceration of the cervix."

"Dr. Goodell, of Philadelphia, has reported one hundred and thirteen cases operated on by him. After giving the indications for the operation as being chiefly confined to the same class of cases which we have typified in the one given by Dr. Playfair, he advises its performance in cases where hereditary tendency to malignant disease exists. 'Acting upon this belief, I have operated upon torn crevices without local or constitutional symptoms, for no other reason than that there was a history of cancer in the family.' "

Dr. Thomas in his DISEASES OF WOMEN declares that: "Nothing more triumphantly displays the value of Emmet's contribution to gynecology in connection with cervical lacerations than a full exhibit of the evils which result from that condition. Its ordinary consequences are:

CHRONIC PERI-UTERINE CELLULITIS (Inflammation around the womb);

EPITHELIOMA (Cancer);

SUBINVOLUTION (Shriveling of a part or of the whole of the uterus);

STERILITY;

MENSTRUAL DISORDERS;

CERVICAL ENDOMETRITIS (Inflammation of lining of neck of womb);

GRANULAR AND CYSTIC DEGENERATION (Forming growths);

FUNGOSITIES OF CORPOREAL ENDOMETRIUM;

NEURALGIA OF CERVIX;

DYSPAREUNIA (Painful coition);

TENDENCY TO ABORTION;

UTERINE DISPLACEMENTS.

“There can be, on the part of those who have been properly impressed with the importance of this lesion, no question as to the truth that all the conditions mentioned may originate from this accident.

“No part of the body of a woman is so liable to the development of cancer as the uterus; no part of the uterus so liable to it as the neck; and no tissue of the neck so liable to it as the glandular lining membrane. Exposure of this by eversion, the result of laceration, would theoretically be supposed to be a fruitful exciting cause of that affection, and practical observation abundantly supports theory in reference to the matter. My own observation has for several years made me feel sure of this, and that of Breiskey, Emmet, and Veit is recorded to the same effect. This alone offers a valid indication for the closure of lacerations attended by local engorgements and irritations.”

“The result of cervical laceration. Each tear of the cervix is an open wound. If during lying-in the genital organs are kept clean, and the lochia (discharges) flow away properly the wounds heal. The opposite surfaces of the tear may unite, and then no trace of it remains; but they seldom do, and a fibrous scar is formed where they meet. When the cervix surrounding the os externum has thus been made into two lips, with a gap between them, and the patient gets up, the intra-abdominal pressure drives the cervix uteri against the posterior vaginal wall. This pressure forces the lips of the cervix asunder, and eversion of the lower part of the cervical canal is the result. By this eversion mucus membrane is exposed to friction and pressure against the vagina. The effect of such friction and pressure are not the same in every case. In some the friction and pressure produce and keep up chronic inflammation of the cervix. Its lips become not only everted, but swollen.” — W. S. Playfair, Professor of King’s College Hospital.

S. Pozzie, M. D., Professor of the Faculty of Medicine, Paris, France, states: “The work of cicatrization itself, and its consequent contraction, may have troublesome results; it compresses the glands, hastening their cystic degeneration and the hypertrophy (enlargement) of the tissue (cystic hypertrophy). This dense cicatricial tissue, by compressing the nerve terminations, can give rise to various nerve disorders, according to Emmet and his disciples.

“It is especially in the pressure of the superior angle, that the trouble has its root; and he sees a frequent cause of nervous

disease in this even in cases in which but little complaint is made of the cervical deformity."

"Doleris follows Emmet, insists upon the cicatricial plug; and attributes part of the formation to a parametritis following the infection of the tear. Another early change in the cervix is the eversion of its lips caused by traction of the vaginal insertion upon the divided cervix; this may reach extreme ectropion (turning outward) of the mucous membrane, which becomes more marked as the disease advances."

J. Halliday Croom, Physician to the Royal Maternity Hospital, Edinburg, writes: "If the cervix is bilaterally torn, and the edges everted and some cystic degeneration as well, then the performance of the operation is urgently demanded. Further, if the laceration is healed, but the cervix nodular and tough, and if some nerve fibers have been embraced in the cicatrix, and are pressed or causing reflex irritation of the uterus or general system, this offers a speedy relief. Even if the area affected is small and if there is some degree of chronic metritis (inflammation) associated with it, the operation should be undertaken and will do good."

The above is but a part of an address delivered by our Specialist before the State Medical Society. Space will not permit a further quotation. The highest medical authorities have been cited and there can be but one conclusion in reference to the serious results from laceration and the necessity of prompt attention to prevent loss of health.

The results of a laceration of the perineum are similar to the effects that follow a laceration of the neck of the womb. These injuries are prolific causes of chronic inflammation, ulceration, local discharges, prolapsus of the pelvic organs and resulting nervous and constitutional troubles which render the life of a woman so afflicted extremely miserable. The parts should be adjusted as soon as possible. Much can be done in a general way by suitable treatment, including medicines taken internally with local applications, soothing tampons, such as Dr. Pierce's Medicated Tampons, etc. Laceration, however, cannot be completely cured in this way, a simple surgical operation being necessary to repair the defects. These operations are extremely successful when properly performed and our surgeons are constantly treating such cases with unequalled success. The perineum is the support to the vaginal walls and as the support is removed the vaginal membrane descends and the womb itself is prone to prolapse. The fact is there is no end of trouble. The health declines steadily and surely. The one condition and about the only one that needs attention is the laceration. Medicines cannot adjust the parts to each other. This can be done only by mechanical means and under the treatment of a specialist. We urge women so afflicted to write to the Invalids' Hotel for advice, and our physicians will be pleased to answer all inquiries,

# STERILITY

(BARRENNESS.)

Real sentiment and interest center in fecundity, since the desires and happiness of mankind are consummated in marriage and procreation. How dreary would life be without love, companionship, and the family! How precious are the ties that bind our hearts to father, mother, daughter, and son! The love of children is innate in the heart of every true man and woman. Each child born supplements the lives of its parents with new interest, awakens tender concern, and unites their sympathies with its young life.

How dreary is the thought that one may attain a ripe old age with neither son nor daughter to smooth the decline of life, or sorrow for his or her departure! How many women desire a *first-born* of love, the idol of their waiting hearts, a soul, which shall be begotten within, clothed with their own nature, and yet immortal! It is a natural instinct, this yearning of the heart for offspring; and yet little is said upon this subject, in which so much is experienced. All that is beautiful and lovely in woman finds its climax in motherhood. What earthly being do we love so devotedly as our mother?



Men and women exhibit but little concern, mere idle curiosity, perhaps, on this subject, unless, perchance, there is no evidence of their own reproductive powers. If, however, these appear to be deficient, then few topics are more deeply interesting or investigated with greater personal solicitude. Such persons will seldom submit their condition to the family physician, for it is a delicate subject, involving personal considerations, and, therefore, they prefer to consult with one who cannot connect their unfortunate situation with any of the incidents which enter into the history of their lives. This is very natural, and sometimes is the only way to keep private matters profoundly secret. Being widely known as specialists, devoting our undivided attention to chronic affections, and having unusual facilities for the investigation and management of such cases, we have been applied to in

innumerable instances, to ascertain the causes of barrenness and effect its removal.

It is admitted that the question of a woman's sterility is practically decided in the first three years of married life, for statistics show that less than ten out of a hundred women who do not indicate their fertility in the first three years of wedlock ever bear children. We have treated many who gave no evidence of fertility for a much longer period of married life, and who afterwards gave birth to children. We are unable to state the proper ratio of the number of the married who are childless; much less have we right to assume that all who decline the responsibilities of motherhood are necessarily barren.

**Causes.** The causes of barrenness may be obliteration of the canal of the neck of the womb, sealing up of its mouth, or inflammation resulting in adhesion of the walls of the vagina, thus obstructing the passage of the uterus. In the latter case, the vagina forms a short, closed sac. In some instances, the vaginal passage cannot be entered in consequence of an imperforate hymen. Again, the cause of barrenness may either be a diseased condition of the ovaries, preventing them from maturing healthy germs, or chronic inflammation of the mucous membrane of the neck of the uterus, which does not render conception impossible, but improbable. It is one of the most common causes of unfruitfulness, because the female seldom, if ever, recovers from it spontaneously. It has been known to exist for twenty or thirty years.

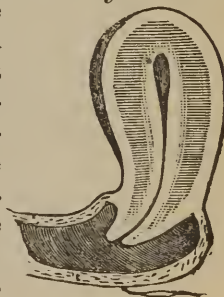
Chronic inflammation of the vagina also gives rise to acrid secretions, which destroy the vitality of the spermatozoa. Suppression of the menses, or any disorder of the uterine functions, may disqualify the female for reproduction. Flexions of the uterus, displacements, congestions, and local debility, may likewise prevent fertility. Sterility may result from impaired ovarian innervation or undue excitement of the nerves, either of which deranges the process of ovulation. Even too frequent indulgence in marital pleasures sometimes defeats conception. Prostitutes who indulge in excessive and promiscuous sexual intercourse, seldom become pregnant. Any thing that enfeebles the functional powers of the system is liable to disqualify the female for reproduction.

**Treatment.** An extensive observation and experience in the treatment of sterility, convinces us that, in the majority of cases, barrenness is due to some form of disease which can be easily remedied. If the passages through the neck of the uterus be closed or contracted, and this is the most frequent cause of sterility, a very delicate surgical operation, which causes little if any pain or inconvenience to the patient, will remove the impediment to fertility. In these cases we have succeeded in removing the contraction and stricture of the neck of the womb by dilatation. When the vaginal walls are so firmly united as to prevent copulation, a surgical operation may be necessary to overcome their adhesion. When the hymen obstructs the vaginal orifice, a similar operation may be necessary to divide it. Vaginismus, which will be treated elsewhere, sometimes causes sterility.

It is proper that we should suggest to the barren, that if sexual intercourse be indulged in only very abstemiously, conception will be more likely to occur than if moderation be not exercised. We may also very properly allude to the fact that there is greater aptitude to fecundation immediately before and soon after the menstrual periods than at other times. In fact, many medical men believe that it is impossible for conception to occur from the twelfth day following menstruation up to within two or three days of the return of the menses.

**Elongation of the Neck of the Womb.** An elongated condition of the neck of the womb, illustrated by Fig. 6, is frequently a cause of sterility. If this part is elongated, slim and pointed, as shown in the illustration, it is apt to curve or bend upon itself, thus constricting the passage through it and preventing the transit of seminal fluid into the womb. An eminent author says, "Even a slight degree of elongation, in which the cervix, or neck, has a conical shape, has been observed to be frequently followed by that condition [sterility]." Our own observations, embracing the examination of hundreds of sterile women annually, lead us to believe that this condition is among the com-

*Fig. 6.*

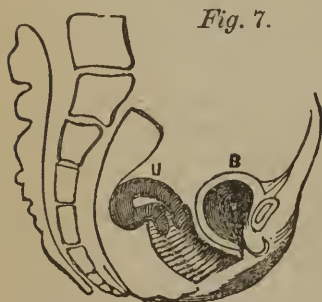


Conoid Neck.

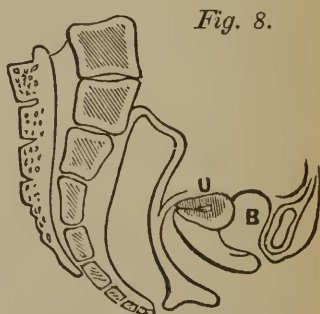
mon causes of barrenness, but, fortunately, it is one of those most easily overcome.

**Treatment.** If the neck is only slightly elongated, this consists in dividing the slim projecting part, by the use of the *hysterotome*. If it be a more aggravated case, a portion of the womb must be removed. This operation is perfectly safe and simple, and, strange as it may seem to those who are not familiar with operations upon the womb, is not painful. We have never seen any bad results follow it, but have known it to be the means of rendering numerous barren women fruitful.

**Flexions and Versions of the Womb.** Flexion of the uterus, in which it is bent upon itself, as illustrated in



Flexion. U, Uterus. B, Bladder.



Version. U, Uterus. B, Bladder.

Fig. 7, produces a bending of the cervical canal, constricting or obliterating it, and thus preventing the passage of spermatozoa through it. Version of the uterus, in which its top, or *fundus*, falls either forward against the bladder (anteversion), as illustrated in Fig. 8, or backward against the rectum (retroversion), may close the mouth of the uterus by firmly pressing it against the wall of the vaginal canal, and thus prevent the passage of spermatozoa into the womb. The treatment of these several displacements will be considered hereafter. We may here remark, however, that they can be remedied by proper treatment. Our mechanical movements, manipulations, and kneadings are invaluable aids in correcting these displacements.

**Disease of the Ovaries.** Sterility may be due to disease of the ovaries. Chronic inflammation of the ovaries may result from uterine disorders of peritonitis, and is commonly at-

tended with a sense of fullness and tenderness, and pain in the ovarian region. These symptoms are more apparent upon slight pressure, or during menstruation. This disease is curable, although it may require considerable time to perfectly restore the health. When this chronic affection is the result of other derangements, the indications are to restore health in the contiguous organs, and to relieve excessive congestion and nervous excitement in the ovaries. The patient should be very quiet during the menstrual period and avoid severe exercise or fatiguing occupations, not only at those periods, but during the intervals. All measures calculated to improve the general health should be adopted. Use injections of warm water, medicated with borax, soda, and glycerine, in the vagina every night and morning. The surface of the body should be kept clean by the daily employment of hand-baths, followed by brisk friction. The bowels, if constipated, should be regulated as suggested for constipation. The system should be strengthened by Dr. Pierce's Favorite Prescription, and, if the blood be disordered, no better alterative can be found for domestic use than Dr. Pierce's Golden Medical Discovery. If the patient does not improve under this treatment, the case should be placed under the immediate care of some physician well qualified by education and experience to critically examine and successfully treat this affection.

**Chronic Inflammation and Ulceration of the Uterus, a Cause of Sterility.** When enumerating the causes of barrenness we mentioned that chronic inflammation of the mucous membrane of the mouth and neck of the womb was the most common affection that defeats conception. Of all diseases of female organs, this is, without doubt, the most common, and, since it does not at first produce great inconvenience or immediately endanger life, it does not excite the attention which its importance demands. It is overlooked, and when the attention is directed to the existence of this long-neglected disease it appears so trivial that it is not regarded as being the real cause of infertility in the patient.

When this disease has existed for a long time, the very structure of the parts involved becomes changed. The glands of the cervical membrane secrete a glairy mucus, resembling the white, or albuminous part of an egg. The secretion is thick and ropy,

and fills the entire mouth and neck of the uterus, thus preventing the entrance of the spermatozoa. The mucous membrane becomes thickened, the inflammation extends to the deeper structures, and, on examination through the speculum, we find the mouth of the uterus inflamed, hardened, and enlarged, shows the mucous follicles just as they are found all along the neck of the womb, in a state of inflammation and enlargement, and filled with a fluid resembling honey. Unless promptly treated it gives rise to ulceration and a thick discharge.

Feebleness of the constitution, impoverishment of the blood, a tuberculous diathesis, want of exercise, uncleanness, tight lacing, disappointment, excessive excitement of the passions, the use of pessaries for displacement of the uterus, overwork, and taking cold, all predispose the cervical membrane to chronic ulceration.

The inflammation may be so mild, and the discharge so trifling in quantity, as scarcely to attract attention. But after it obtains a firmer hold, and in most cases, it is aggravated by exposure or neglect, the patient experiences dragging sensations about the pelvis, and pain in back and loins, accompanied with a bearing-down sensation and numbness or pain extending to the thighs.

The discharge is thick, starch-like, and generally irritating. The patient becomes irascible, capricious, querulous, and sometimes moody and hysterical. She is easily discouraged, her appetite and digestion become impaired, and she grows thin and does not look or act as when in health.

**Treatment.** In offering a few hints for the domestic management of these abnormal conditions, we would at the same time remark, that, while health may be regained by skillful treatment, recovery will be gradual. We especially wish to guard the patient against entertaining too strong expectations of a speedy recovery. Although she may employ the best treatment known, yet from three to five months may elapse before a perfect cure can be effected. In persons of scrofulous diathesis, in whom the recuperative forces are weakened, it is very difficult to effect a radical cure. It is equally true, however, that under domestic management alone, thousands have been restored to perfect health and fruitfulness.

Hygienic management consists in toning the functions of the skin by daily bathing the surface of the body, and quickening the circulation by brisk friction. The patient should rise early in the morning, and exercise in the fresh and invigorating air. Those who sleep in warm rooms, or spend much of their time in bed, will continue to have congestion of the uterus, and habitual discharges from this enfeebled organ. The patient should take daily walks, increasing the length of the excursion from time to time, but not to the extent of producing fatigue. The bowels, if constipated, should be regulated. Strengthen the system by using Dr. Pierce's Favorite Prescription. The mouth and neck of the uterus should be thoroughly cleansed by the use of the syringe, as suggested for the treatment of leucorrhea. The use of the solution of Dr. Pierce's Purifying and Strengthening Lotion Tablets there advised will also be beneficial, if thoroughly applied.

A most valuable course of local treatment which may be adopted by any intelligent lady without the aid of a physician, and one that will result in the greatest benefit when there is morbid sensibility, congestion, inflammation, or ulceration about the mouth or neck of the womb, consists in applying to those parts a roll of medicated cotton or soft sponge, allowing it to remain there for twelve hours at a time. A piece of fine, soft, compressible sponge, as large as a hen's egg, or a roll of cotton batting of two-thirds that size, is thoroughly saturated with pure glycerine. Securely fasten to it a stout cord a few inches long. The vagina and affected parts having been thoroughly cleansed with warm water and Castile soap, as advised in the treatment of leucorrhea, the sponge or cotton should be passed up the vagina with the finger, and pressed rather firmly against the mouth and neck of the womb, which, being enlarged, and, consequently falling below its natural position, will generally be low down in the vagina, and so hardened as to be unmistakably distinguished from the surrounding parts by the sense of touch. The glycerine, having a very strong affinity for water, will absorb large quantities of the *serum*, which has been effused into the affected tissues in consequence of their congestion and inflammation, and thus reduce the inflammation and enlargement. This is the cause of the profuse, watery discharge which follows the application. In twelve hours after the sponge or cotton has been applied, it

should be removed by means of the attached thread, one end of which has been purposely left hanging out of the vagina. Then thoroughly cleanse the vagina with warm water, use the solution of Dr. Pierce's Lotion Tablets as suggested for the treatment of leucorrhea, and repeat the glycerine application the following day or every other day.

If there is no irritation or tenderness of the vagina, add one drachm of tincture of iodine to each ounce of the glycerine, alternating the use of this with that of pure glycerine; or, the iodine and glycerine may be used every third day, and the glycerine alone on the two intervening days. As the iodine will color the finger somewhat, it is well to know that this unpleasant effect may be almost or entirely avoided by coating that member with lard, sweet oil, or vaseline. The stain may be readily removed with solution of iodide of potassium. The use of Doctor Pierce's Antiseptic and Healing Suppositories as advised on another page under the head of Ulceration of the Uterus will aid greatly in effecting a cure.

If your medicine dealer does not have these Suppositories in stock, mail 35 cents to Dr. V. M. Pierce, Buffalo, N. Y., and a box will be sent you by return post.

It is well to alternate Dr. Pierce's Golden Medical Discovery with Dr. Pierce's Favorite Prescription, taking of each three times a day. By persevering in this course of treatment, nine-tenths of those who are thus afflicted will improve and be fully restored to health, fruitfulness and happiness. If barrenness continues, the case should be unreservedly submitted, either in person or by letter, to a physician skilled in the diagnosis and treatment of these affections.

From the foregoing remarks, the reader will perceive that there are a variety of diseased conditions, any one of which may produce sterility. It is equally true that nearly all these conditions may be easily cured by proper medical or surgical treatment. A frequent cause of barrenness is stricture of the neck of the uterus. No medicine that a woman can take or have applied will remove this unnatural condition. Fortunately, however, the means to be employed cause no pain, are perfectly safe, and the time required to effect a cure is short, rarely over twenty or thirty days.

## FALLING AND DISPLACEMENTS OF THE WOMB.

The relative positions of the womb and surrounding organs, when in a state of health, are well illustrated on page 108. The womb is supported in its place by resting upon the vaginal walls, and by a broad ligament on either side, as well as by other connective tissues. By general debility of the system, the supports of the womb, like the other tissues of the body, become weakened and inadequate to perfectly perform their duty, thus permitting various displacements of that organ.

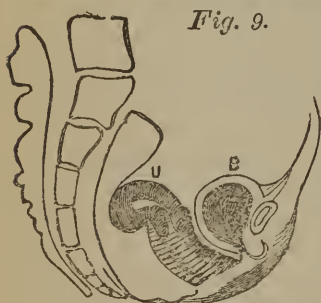
**Prolapsus, or Falling of the Uterus,** is a common form of displacement. It has been erroneously regarded as a local uterine disease, requiring only local treatment instead of being considered as a symptom of general derangement, and, therefore, requiring constitutional treatment. Hence, variously devised supporters have been invented to retain the womb in position after its replacement. It is a law of physiology, that the muscular system is strengthened by use, and that want of exercise weakens it. The blacksmith's arm is strengthened and developed by daily exercise. Support his arm in a sling, and the muscles will be greatly weakened and wasted. So when artificial supports are used to retain the womb in position, thereby relieving the supporting ligaments and tissues of their normal function, the *natural* supports of the uterus are still further weakened, and the prolapsus will be worse than before when the artificial support is removed. Besides, all these mechanical contrivances are irritating to the tissues of the womb and vagina, and frequently produce congestion, inflammation, and even ulceration, thus rendering the patient's condition much worse than before their employment. These worse than useless appliances should never be resorted to for the temporary relief which they sometimes afford. Constitutional treatment together with appropriate applications is the only effectual method of remedying this morbid condition.

**Symptoms.** When the displacement is sufficient to cause any serious disturbance, the prominent symptoms are a sensation of dragging and weight in the region of the womb, pain in the

back and loins, inability to lift weights, great fatigue from walking, leucorrhœa, a frequent desire to urinate, irritation of the lower bowel, and derangement of the stomach. The womb may protrude from the vaginal orifice; in very rare cases, wholly protrudes, and may be inverted.

**Causes.** As we have already stated, general debility favors prolapsus of the womb, but various general and local circumstances and conditions also favor its occurrence. Wearing heavy garments supported only by the hips, compressing the waist and abdomen with tight clothing, thus forcing the abdominal organs down upon the womb, are fruitful causes of this affection. Excesses in sexual intercourse give rise to leucorrhœa, producing a relaxed condition of the vagina, upon which the womb rests, and, in this way, one of its supports is weakened. Enlargement of the uterus from congestion, and inflammation or tumors also favor prolapsus. Abortion may leave the womb enlarged, its supports weakened, and result in this displacement.

**Flexions and Versions.** Instead of sliding down into



Retroflexion. U, Uterus (Womb).  
B, Bladder.

the vagina, as in prolapsus, the uterus is liable to fall or be forced into other unnatural positions. When the uterus is bent upon itself, it is called *flexion*. If the bending is backward, it is called *retroflexion*; if forward, *anteflexion*. Fig. 9, represents the former condition, the uterus being flexed backward so that the fundus, or upper part of the womb, is pressed against the rectum, while the neck of the uterus

remains in its natural position. This is a common form of displacement, and generally occurs between the ages of fourteen and fifty.

**Symptoms.** The prominent symptoms of retroflexion of the uterus are a sense of weight in the region of the rectum, difficulty in evacuating the bowels, and, sometimes a retention of the feces. There may also be suppression of the urine, and the menses may be diminished in quantity. If retroflexion is due to a chronic enlargement of the uterus, caused by abortion

or parturition, the patient suffers from an immoderate menstrual flow.

**Causes.** The principal causes of retroflexion are congestion, enlargement and tumors of the uterus. Congestion is liable to occur in women possessing an extremely active temperament, as well as in those of sedentary and indolent habits. Retroflexion is a common displacement in both married and unmarried women; it is a secondary affection, and, when it is caused by congestion, the menses are painful and reduced in quantity, and there is pain in the back and a sense of weight in the region of the rectum. In some instances, there is a reflex irritation of the mammary glands, and a consequent secretion of milk. There may also be nausea and vomiting, which often lead to the erroneous opinion that the patient is pregnant.

*Anteflexion* of the uterus denotes a bending forward of the body and fundus of the uterus, while the neck remains in its natural position.

In versions of the uterus, neither the body nor the neck of the womb is bent upon itself, but the whole organ is completely turned backward or forward.

*Retroversion* of the uterus, illustrated by Fig. 10, signifies a change in the position of the womb, so that the upper, or fundal portion of the organ drops back toward the concavity of the sacrum, while the neck preserves a straight line in the opposite direction. The fundus presses forcibly against the rectum, while the upper part of the vagina bends abruptly and forms an acute angle near the mouth of the uterus.

**Symptoms.** Retroversion is indicated by bearing-down pains in the loins and difficulty in evacuating the bowels. The feces may accumulate in the rectum, because they cannot pass this obstruction.

**Causes.** Jumping, falling, or undue pressure from the contents of the abdomen, may suddenly cause retroversion of the

Fig. 10.



Retroversion. B, Bladder.  
U, Uterus (Womb).

uterus. Sometimes retroversion results from obstinate constipation.

**Anteversion.** This term designates another unnatural position of the uterus, in which the fundus, or upper part of the organ, falls forward, as illustrated by Fig. 11, while the neck points towards the hollow of the sacrum. This position of the womb is the reverse of that of retroversion. In its natural position, the fundus of the uterus is slightly inclined forward, and any pressure, or forward traction, is liable to cause it to fall still further in that direction.

**Symptoms.** One of the most common symptoms of anteversion is a frequent desire to urinate, in consequence of the pressure of the uterus upon the bladder. The free flow of the menses is sometimes obstructed.

**Causes.** The causes are tight lacing, prolapsus of the abdominal organs, weakness of the supporting ligaments, and enervating habits.

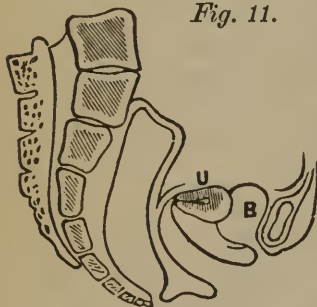
**Treatment.** In treating all the various displacements of the uterus, the prominent indication is to tone up the general system, for by so doing we also strengthen the uterine supports.

Digestion should be improved, the blood enriched, and nutrition increased, so that the muscles and ligaments which retain the womb in position may become firm and strong.

The womb will thus be gradually drawn into position by their normal action and firmly supported. It is a great mistake, made by physicians as well as patients, to consider a displacement of the uterus a *local* disease, requiring only local treatment. A restoration of the general health will result in the cure of these displacements, the uterus will regain its tone and muscular power, and the local derangement, with its attendant pain and morbid symptoms, will disappear.

It is true that displacements of the womb may be associated with inflammation and ulcers, which require local treatment, as elsewhere suggested; but simple displacement of the uterus may

Fig. 11.



Anteversion. U, Uterus. B, Bladder.

be remedied by pursuing the following course of sanitary and medical treatment. Sleep on a hard bed, rise early, bathe, and take a short walk before breakfast. Dress the body warmly and allow sufficient space for the easy and full expansion of the lungs. Eat moderately three meals a day, of those articles which are nutritious and readily digested. Keep the bowels regular by the use of proper food. If they are constipated, use Dr. Pierce's Pellets to keep them open and regular. Avoid retaining the standing position too long at a time, especially when the symptoms are aggravated by it. Many energetic women disregard their increasing pains, and keep upon their feet as long as possible. Such a course is extremely injurious and should be avoided.

As a general restorative and uterine tonic, nothing surpasses Dr. Pierce's Favorite Prescription, which is sold by druggists and accompanied with full directions for use. If leucorrhea is an attendant symptom, the treatment suggested for that condition should be employed. The use of Dr. Pierce's Antiseptic and Healing Tampon Suppositories, applying one every third night after having first cleansed the vagina and neck of womb thoroughly by the use of warm water and soap as an injection, will prove of great benefit in giving strength to the supports of the womb and its appendages.

By persevering in the rational treatment which we have suggested for the various displacements of the womb, nearly all who suffer from such derangements may be fully restored to health. The patient should not expect *speedy* relief. Considerable time will be necessary to bring the general system up to a perfect standard of health, and, until this is accomplished, no great improvement in the distressing symptoms can be expected. Mechanical movements are especially effective in this class of cases. We have successfully treated many obstinate cases in which the displacements were very serious.

Many cases are so severe that the bladder becomes displaced or even protrudes; in others the walls of the vagina protrude, covering a pouch of the rectum.

Where frequent and severe labors have resulted in tearing and weakening the natural supports beyond a limit that nature's efforts can repair, surgical assistance is necessary to reinforce the supports.

Advance in surgical skill has made it possible for our specialists to do this effectively and surely.

The plastic operations usually done are ineffective and in a few months their benefit disappears; removal of the womb is of no benefit and makes the patient worse.

Our specialists usually operate after the method of Professor Wertheim as modified and improved by their experience. The results are very successful and attended with little risk or discomfort. There is no removal of any of the pelvic organs, and all the parts are restored to their normal function and a healthful position.

In many cases local electrical and supportive treatment requiring about a month's stay in our Sanitarium is all that is required.

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## CERVICAL STRICTURE AND DYSMENORRHEA.

### (PAINFUL MENSTRUATION.)

*Dysmenorrhea*, from its Greek derivation, signifies a *difficult monthly flow*, and is applied to menstruation when that function becomes painful and difficult. Menstruation, like other healthy operations of the body, should be painless, but too frequently it is the case, that discomfort and distress commence twenty-four hours before the flow appears and continue with increasing pain, sickness at the stomach and vomiting, until the patient has to take to the bed. When the discharge does occur, speedy relief is sometimes obtained, and the patient suffers no more during that menstrual period. With others, the commencement of the function is painless, but from six to twenty-four hours after, the flow is arrested and the patient then experiences acute suffering. Pain may be felt in the back, loins and down the thighs. Sometimes it is of a lancinating, neuralgic kind, at others, it is more like colic. Frequently the distress causes lassitude, fever, general

uneasiness, and a sense of lethargy. There are those who suffer more or less during the entire period of the flow, while the distress of others terminates at the time when a membranous cast is expelled. For convenience of description, dysmenorrhea has been divided into the following varieties: *neuralgic*, *congestive*, *inflammatory*, *membranous*, and *obstructive*.

*The neuralgic variety* of dysmenorrhea, sometimes called *spasmodic* or *idiopathic*, occurs when there is excessive sensibility of the ovaries and uterine nerves, which sympathetically *respond*, especially to cutaneous, biliary, and sexual irritation, and when ovarian or uterine irritation is communicated to distant nerve-centres. In the first class, usually comprising lean persons of an encephalic temperament, whatever disorders the functions of the general system instantaneously reflects upon the ovaries and uterine nerves, and the menstrual function is correspondingly disturbed, and instead of being painless the flow becomes spasmodic with paroxysms of distress. In the second class, which includes those persons who are plethoric, the ovarian and uterine nerves seem to be the origin and centre of irritation, which is sometimes so severe as to cause indescribable pain. We have known women who affirmed that the severity of labor pains was not so great as that from this cause. In one instance the subject suffered thus for eleven years and then became a mother, and has ever asserted that her periodic suffering was far more intense than the pain experienced during her confinement. These neuralgic pains fly along the tracks of nerves to different organs and capriciously dart from point to point with marvelous celerity, producing nausea, headache and sometimes delirium.

**In the congestive variety** of dysmenorrhea, the menstrual period may be ushered in without pain; after a few hours, the pulse becomes stronger and more rapid, the skin grows hot and dry, the menses stop, there is uneasiness, restlessness, and severe pelvic pains. Evidently the mucous membranes of the Fallopian tubes and uterus have become congested, and the pain results from the arrest of the functional process, the exudation of blood.

**The causes** are plethora, exposure to cold, excitement of the emotions or passions, and a morbid condition of the blood. Sometimes congestion arises in consequence of a displacement of the uterus,

**In the inflammatory variety** the mucous membrane of the uterus is the seat of irritation. The blood flows into the capillary vessels in greater abundance than is natural, and those vessels become over-dilated and enfeebled and so altered in their sensibility as to produce local excitement and pain. It may be associated with inflammation of the ovaries, peritoneum, or bladder. Upon the return of the menses, there is a dull, heavy, fixed pain in the pelvis, which continues until the period is completed. There is generally tenderness of the uterus, and also leucorrhea during the intervals between each monthly flow.

**In the membranous variety** of dysmenorrhea, the entire mucous membrane which lines the cavity of the uterus, in consequence of some morbid process, is gradually detached and expelled at the menstrual period.

**Symptoms.** There are steady pains at the commencement of the menstrual flow, and they increase in violence and become decidedly expulsive. The mouth of the uterus gradually dilates, and finally the membrane is forced out of the uterus, attended with a slight flow of blood and an entire subsidence of the pain.

**The treatment,** in all the preceding varieties of dysmenorrhea, should consist of measures to determine the circulation of the blood to the surface, and increase the perspiratory functions. Congestion and inflammation of the internal organs are generally induced by exposure to cold or from insufficient clothing. Sometimes they follow from neglect of the skin, which is not kept clean and its excretory function encouraged by warm clothing. The domestic treatment at the monthly crisis should be commenced by the administration of hot foot, and sitz-baths, after which the patient should be warmly covered in bed, and bottles of hot water applied to the extremities, back, and thighs. Dr. Pierce's Compound Extract of Smart-weed should be given in full doses, frequently repeated, to secure its diaphoretic, emmenagogue, and anodyne effects, which, for this painful affection, is unsurpassed. For the radical cure of this disease, whether of a congestive, inflammatory, or neuralgic character, Dr. Pierce's Favorite Prescription, which is sold by druggists, is a pleasant and specific remedy, which will most speedily correct the abnor-

mal condition that produces the trouble, and thereby obviate the necessity of passing this terrible ordeal at every monthly period. The patient should take two teaspoonfuls of the medicine three times a day, and keep up its use in these doses for weeks. Frequently, one month will suffice to cure, but in most cases, a longer season is required. In the end, the suffering patient will not be disappointed, but will become a new being, ready for the enjoyment and duties of life. The bowels should be kept regular throughout the treatment by the use of Dr. Pierce's Pleasant Pellets, if necessary. A hand or sponge-bath should be used daily to keep the skin active, and be followed by a brisk rubbing of the surface with a rough towel or flesh-brush. A wet sheet pack will cleanse the pores of the skin and invite the blood into the minute capillaries of the surface, and thus prove of great benefit. It should be repeated after an interval of seven days, but ought to be omitted if near the approach of a menstrual period. The clothing should be warm to protect the system against changes of temperature; especially should every precaution be taken to keep the feet dry and warm. The patient should walk in the open air and the distance should be regularly lengthened at each succeeding walk. If the course of treatment which we have suggested be faithfully pursued a permanent cure will be effected.

**In the obstructive variety** of dysmenorrhea, some organic impediment hinders the exit of the menstrual blood from the uterus, which, consequently, becomes distended and painful. The pain may be constant, but is most acute when the uterus makes spasmodic efforts to discharge the menstrual blood. If these efforts prove successful, there is an interval of relief. Flexion or version of the womb may produce partial occlusion of the canal of the neck of the uterus, thus preventing the free flow of the menstrual fluid through it. Tumors located in the body or neck of the uterus often cause obstruction to the free discharge of the menses. Imperforate hymen and vaginal stricture also sometimes cause obstruction and give rise to painful menstruation. These abnormal conditions will be reviewed elsewhere.

Partial adhesion of the walls of the neck of the womb may result from inflammation of the mucous lining, and prevent a

Fig. 12.

THE UTERINE  
DILATOR.

This instrument is introduced into the canal of the uterine neck with its blades closed. By means of the thumb-screw the blades are then separated as shown in this illustration, the cervical canal being thereby dilated to the required extent.

free and easy exit of the menstrual fluid. In many cases, the contracted and narrowed condition of the canal of the cervix seems to be a congenital deformity, for we can trace it to no perceptible cause. It is also true that contraction and partial, or even complete, stricture of the cervix, or neck of the womb, often results from the improper application of strong caustics to this passage by incompetent and ignorant surgeons. Every person has observed the contraction of tissue caused by a severe burn, which often produces such a distortion of the injured part as to disfigure the body for life. A similar result is produced when the neck of the womb is burned with strong caustics. The tissues are destroyed, and, as the parts heal, the deeper-seated tissues firmly contract, forming a hard unyielding cicatrix, thus constricting the neck of the womb, through which the menses pass into the vagina.

**Treatment.** From the nature of this malady, it will readily be seen that no medical treatment can effect a radical cure. We must therefore resort to surgery. Temporary relief may be obtained from repeated dilations of the constricted part of the cervical canal. This may be accomplished by using a very smooth probe which is fine at the point, but increases in size, so that its introduction will widen and expand the orifice and canal. The stricture may be overcome in many cases by using different sized probes. In some instances, we have employed the uterine dilator, represented by Fig. 12. We have also introduced sea-tangle and sponge tents into the neck of the womb, and allowed them to remain until they expanded by absorbing moisture from the surrounding tissues. The latter process is simple, and in many cases preferable. By means of a speculum (see Figs. 15 and 16), the mouth of the womb is brought into view, and the surgeon

seizes a small tent with a pair of forceps and gently presses it into the neck of the womb, where it is left to expand and thus dilate the passage. If there is a persistent disposition of the circular fibers of the cervix to contract, and thus close the canal, a surgical operation will be necessary to insure permanent relief.

On this subject Prof. S. Pozzi of Paris, writes: "It can be asserted that the most frequent cause of dysmenorrhea and sterility in women is a rather common malformation of the cervix uteri by which the os (mouth) is unduly narrowed. This anatomical condition seems to be the result of a certain degree of arrest of development, for it generally coexists with shape or type of uterus very similar to the infantile type; the cervix is long and the body is more or less bent forward.

"Dysmenorrhea is then most often present and it is in those cases that pains are most severe. Occasionally dysmenorrhea may be absent, but the almost universal result is sterility. Here dilatation is insufficient and illusory on account of its ephemeral effect.

"I have obtained the most satisfactory results from my operation, the benignity of which is absolute. When care is taken to operate aseptically, and no lesions exist, no accident need be feared, especially hemorrhage. Nor is subsequent infection possible, as it is where the cervical wound has been left open to spontaneous cicatrization. I can say personally that I have not experienced a single complete failure. Success is universal as regards dysmenorrhea, which is immediately and definitely cured. As regards sterility, in a large percentage pregnancy followed the operation, going to term without an accident, the labor being normal. Several of my cases are truly remarkable; women who have been married for five, ten and in one instance sixteen years, never becoming pregnant, were impregnated some months after the operation."

In performing the operation, we use something like the above improved method. The cervical canal is enlarged by an incision on either side and so stitched as to prevent union except by leaving an opening of full size. The operation is but slightly painful, and in the hands of a competent surgeon is perfectly safe. We have operated in a very large number of cases and have never known any alarming or dangerous symptoms to

result. The day after the operation the dressing is removed and the patient is able to be around the room in comfort. Improvement is rapid. In married women previously sterile over sixty-five in a hundred have become pregnant.

Many times patients cannot understand why it is that the operation of cutting the constricted cervix causes no pain; they often being entirely unconscious of the making of the incision. The explanation is easy. The cervix uteri, or neck of the womb, is supplied with but few nerves of sensation, and is almost as destitute of sensation as the finger or toe nails, the paring of which causes not the slightest pain. On this account we never find it necessary to administer chloroform or any other anæsthetic when undertaking this operation. If the patient be extremely sensitive the application to the cervix of a weak solution of cocaine is quite sufficient to completely benumb or anæsthetize the parts so as to entirely avoid all pain from the operation.

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## AMENORRHEA.

The term *amenorrhea* signifies the absence of menstruation when it should occur. It may be considered under two general heads: when it fails to be established at the proper age, and when after having made its appearance it ceases to return at the usual periods. The term *retention* has been applied to the first, and that of *suppression* to the latter. Menstruation may fail to be established in consequence of organic defects, or from some abnormal condition of the blood and nervous system.

**Malformation of the Vagina.** Retention of the menses may result from malformation of the vaginal canal, which sometimes terminates before it reaches the womb, being simply a short, closed sac. If the uterus and ovaries are perfect, all the feminine characteristics are manifest, and a vaginal exploration discloses the nature of the difficulty. If, however, the sides of this passage adhere in consequence of previous inflammation, they may be carefully separated by a surgical operation, and this function restored.

**Absence or Malformation of the Womb.** The uterus may be deformed or entirely absent, and yet there be an inclination, or symptoms indicative of an effort, to establish this

function. The individual may be delicate in organization, graceful in bearing, refined and attractive in all feminine ways, and yet this organ may be so defective as to preclude the establishment of the menstrual function. Sometimes there is merely an occlusion of the *mouth* of the uterus, the perforation of which removes all difficulty. In others, the *neck* of the womb is filled with a morbid growth, or the walls of its canal are adherent, as the result of inflammation, and may be separated by a small silver or ivory probe, and the menses be thus liberated.

**Imperforate Hymen.** The hymen is a circular, or semilunar membrane, which imperfectly closes the outer orifice of the vagina in the virgin. When of a semilunar shape, it usually occupies the lower or posterior portion of the canal, leaving an opening in the upper or anterior portion, varying from the size of a quill to that of a thimble, through which the menstrual fluid exudes. This membrane is usually ruptured and destroyed by the first sexual intercourse, and, hence, its presence has been considered evidence of virginity. Its absence, however, must not be considered a conclusive evidence of sexual intercourse, for, as Dr. Dunglison says, "many circumstances of an innocent character may occasion a rupture or destruction of this membrane. It is often absent in children soon after birth; while it *may* remain entire after copulation. Hence, the presence of the hymen does not *absolutely* prove virginity; nor does its absence prove incontinence, although its presence would be *prima facie* evidence of continence."

Sometimes this membrane, when not imperforate, is so thick and strong as to render sexual intercourse impossible, and requires a cutting operation to open the vagina. Several such cases have been operated upon at the Invalids' Hotel and Surgical Institute.

It occasionally happens that the hymen is entire, or imperforate, at birth. This may not be discovered before puberty. But when this period arrives and the menstrual discharge takes place into the vagina, the female will suffer from the retention and accumulation of this secretion, and ultimately a tumor or a protrusion of the membrane which closes the vagina will occur, giving rise to severe pain and other serious symptoms. The retained menstrual fluid, increasing in quantity at every monthly

period, dilates the womb as well as the vagina, and even the Fallopian tubes become distended, presenting at length an urgent necessity for relief.

**Treatment.** This condition admits of relief only by operative surgery. The operation consists in dividing the hymen by a crucial incision, thus allowing the accumulated fluid to be discharged, after which the vagina is cleansed by syringing it with warm water.

**Absence of the Ovaries.** Let us suppose the case of a young woman who has fully reached the period of puberty without having menstruated. All the organs which we have described, are manifestly developed, she is healthy, vigorous, robust, and able to exercise freely or to engage in laborious occupations. But we notice that her voice is not sweetly feminine, nor is her presence timid, tender, and winning; there is wanting that diffident sexual consciousness, which gently wooes, and at the same time modestly repels, and tends to awaken interest, curiosity and desire. Considering also that she has never manifested any inclination to menstruate we are irresistibly led to the conclusion that the ovaries are wanting; the delicate mustache upon the upper lip, the undeveloped breasts, the coarse features and her taste for masculine pursuits, all concur in this diagnosis. Thus we account for the harshness of the voice, fitted for command rather than to express the mellow, persuasive cadences of love. Such a malformation cannot be remedied.

**Retention and Suppression from Morbid Conditions of the Blood.** Non-appearance, as well as suppression of the menses, may result from an abnormal state of the blood. The first condition which demands our attention under this head is *plethora*. In robust, plethoric females the menses are sometimes very tardy in their appearance, and every month the attempt to establish this function is attended with pain in the head, loins and back, chilliness, nausea, and bloating of the abdomen. Sometimes there is intolerance of light or sound, and cerebral congestion, amounting almost to apoplectic symptoms. The pulse is full and strong, the blood abundant and surcharged with red corpuscles. Such persons may be accustomed to luxurious living, and there is evidently a predisposition to abnormal activity of the alimentary functions.

**Treatment.** We may briefly suggest that such subjects should engage in laborious physical exercise in order to expand the surplus of vitality, and should lessen the daily amount of food taken, and use that which is light and unstimulating. One must also prevent the determination of blood to the head, by keeping it cool, and the feet warm, thereby increasing the flow of blood to the extremities. The volume of the circulation may be diminished by acting upon the natural outlets, such as the skin, kidneys, and bowels. The proper means and appliances for quickening the circulation of the blood are indicated, and friction upon the surface, bathing, the daily use of such cathartics as Dr. Pierce's Pellets, and, finally the use of some general uterine stimulant, such as Dr. Pierce's Favorite Prescription, will generally prove successful in cases of amenorrhea resulting from plethora.

**Retention and Suppression from Anæmia.** To describe the condition of the patient whose blood is low and deprived of the richness, warmth, and bloom it once possessed when it kindled admiration and enthusiasm in others, is but to give a picture of a numerous class of female invalids. Fig. (A) illustrates the blood in health and (B) in disease. Figure B, shows plainly the appearance of blood cells in Anæmia, also the

NORMAL BLOOD

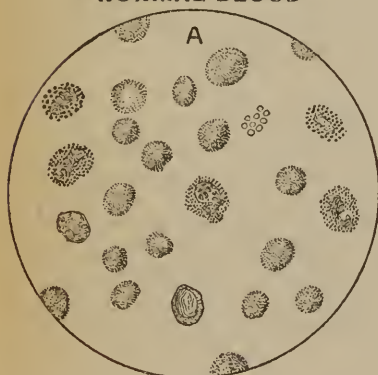


Fig. A

IN ANÆMIA



Fig. B

characteristic broken-down cells from the great loss of albuminous material (Hæmoglobin) as they appear through the microscope in Chlorosis, a disease very common in *young womanhood* characterized by a greenish pallor of the skin, depraved appetite, langour, heart palpitation, etc., commonly called "green sickness."

**Chronic Decline**, with its attendant anæmia, may be induced by bad habits, destitution, or constitutional depravity. Sickly forms, wrecks of health, address our senses on every side. All these subjects evidently once had a capital in life, sufficient, if properly and carefully husbanded, to comfortably afford them vital stamina and length of days. Alas! they have squandered their estate, perchance in idleness and luxurious living, or have wasted it in vanities or misdirected ambition. Having become bankrupts in health, there is necessarily a failure of the menstrual function, and then follows a *panic*. All the blame of the insolvency and general derangement is unjustly attributed to the non-performance of the duties of the uterus. Thus, this organ is altogether *dependent* upon the general health for its functional ability, yet frequently treatment is instituted to compel menstruation, regardless of the condition of the system. Thus the enfeebled uterus is wrongfully held responsible for general disorder, because it ceases to act, when *by acting* it would further deplete the blood and thus materially contribute to the already existing chronic decline.

No matter what are the causes of this decline, whether they are the follies of fashion, the effect of indolence, debility in consequence of insufficient food, perversion of nutrition by irregular habits, lack of exercise, or the taking of drastic medicines, the result is anæmia and amenorrhea.

**Treatment.** We would suggest in such cases a nutritious diet, increased exercise, cleanliness, regular habits, hard beds, and useful employment. The diet may be improved by animal broths, roasted meats, fresh beef, mutton, chicken, or eggs, and the dress should be comfortable, warm, and permit freedom of motion. The patient should indulge in amusing exercises, walking, swinging, riding, games of croquet, traveling, singing, percussing the expanded chest, or engage in healthful calisthenic exercises. The hygienic treatment of this form of amenorrhea, then, consists in physical culture, regular bathing, and the regulation of the bowels, if constipated.

The *medical treatment* should be directed to enriching the blood, improving nutrition, toning up the generative organs, and the health of the whole system. This requires the employment of uterine and general tonics, and Dr. Pierce's Favorite Prescription, which is sold by druggists, happily combines the properties required. It improves digestion, enriches the blood, exercises a tonic and gently stimulating effect upon the uterus and ovaries, and thus promotes the function of menstruation.

It is not a strong emmenagogue, but operates slowly, yet surely, and in accordance with physiological laws, being eminently congenial in its effects upon the female system, and, hence, not liable to do harm. There is danger in employing active driving medicines, besides, no emmenagogue, however powerful, can establish the menstrual function so long as the system is in a debilitated condition and the blood reduced. The restorative effects of the "Favorite Prescription" should be secured by administering it regularly, in from one to two teaspoonful doses, or one or two tablets, three or four times a day, for several weeks, and as the system is built up and those symptoms appear which indicate a return of the menses, their visitation may be encouraged by the use of hot foot and sitz-baths, and frequent doses of Dr. Pierce's Compound Extract of Smart-Weed. But the latter should only be used when symptoms of approaching menstruation are manifested. By following out this course of treatment, a soft flush will gradually take the place of the pallor of the cheeks, the appetite will return and the health will be restored.

**Acute Suppression of the Menses** may be caused by *strong emotions* as excessive joy, or by violent *excitement* of the *propensities* as intense anger, sudden fright, fear, or anxiety. Suppression may result from sudden exposure to cold, immersion of the hands or feet in cold water, drinking cold water when the body is heated, sitting on the cold ground or damp grass, or from a burn or wound. It is not uncommon for women to labor in the heated wash-room, pounding, rubbing, and wringing soiled linen, thereby overtaxing the delicate physical system. While feeling tired and jaded, and reeking in perspiration, they rinse and wring the clothes out of cold water and hang them upon the line with bare arms, when the atmosphere is so freezing that the garments stiffen before they finish this part of the task. Is it any wonder that acute suppressions occur or that inflammations set in?

The symptoms which naturally follow are a quick pulse, hot skin, thirst, fever, headache, and dizziness, and the inflammation may locate in the ovaries, uterus, lungs, bowels, brain, or other parts. No matter what organs are attacked the menses are suppressed. The suppression can generally be attributed to an adequate cause, resulting in constitutional disturbance. The severity and duration of the attack and the power of the constitution to resist it must determine the gravity of the consequences.

**Treatment.** As acute suppression of the menses is due to derangement of the circulation of the blood, caused by taking cold, by violent excitement of the propensities or excessively strong emotional experience, the prominent indication is to secure its speedy equalization. Give a hot foot bath, a warm sitz-bath, or the spirit vapor-bath and administer Dr. Pierce's Compound Extract of Smart-Weed in doses to produce free perspiration. Dr. Eberle, a very celebrated medical author, says that he used the Extract of Smart-Weed in twenty cases of amenorrhea, and affirms, "with no other remedy or mode of treatment have I been so successful as with this." Our experience in the use of the Extract has been equally satisfactory. Should this treatment not establish the function, Dr. Pierce's Favorite Prescription should be given three times a day until the system is invigorated, say for twenty-eight days, when the above course may be repeated, and generally with success. Should the case be complicated with inflammation of the lungs, brain, or other vital organs, manifesting alarming symptoms, the family physician should be called. The treatment should be active and suited to the indications of each particular case. When the disease becomes chronic, the active stage of symptoms having passed, and it continues to linger without making the desired improvement, all the means suggested for the treatment of suppression from anæmia should be employed. Their use will be followed by the most gratifying results. It should be borne in mind, however, that when we suggest any treatment in this volume, it is generally such as the family may institute and apply, and does not by any means represent the variety or extent of the remedial resources which we employ when consulted in person or by letter. We refer our readers to only a few of the safe and reliable remedies which we have prepared and placed within their reach, and give them just such hygienic advice as we think will best serve their interests.

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## MENORRHAGIA.

(PROFUSE MENSTRUATION.)

The word *Menorrhagia*, which is of Greek derivation, literally means *monthly breaking away*, and is employed to designate profuse menstruation. This disorder must not be confounded with those hemorrhages which are not periodical, and which are due to other causes. The term *menorrhagia* is restricted to an

immoderate monthly flow. The menstrual flow may occur too often, continue too long, or be too profuse. It induces a feeble pulse, cold extremities, weak respiration, general debility, and may occur in opposite states of the system, *i. e.*, in women who have a plethoric and robust habit, or in those of flaccid muscles and bloodless features. When natural the menstrual discharge is so gradual that by mixing with the vaginal secretions it is prevented from coagulating, but in this disease clotted masses are often observed.

**Symptoms.** In women of a *plethoric* habit, it is ushered in by itching and heat in the vagina, pain and a feeling of weight in the loins and lower part of the abdomen, and, at times, the breasts become hot and painful. There is considerable thirst, headache and giddiness. At last, the blood appears and flows profusely, and all the violent symptoms at once subside. The rest of the period is marked by an inordinate flow, leaving the system weak from the loss of blood. It most frequently occurs in persons who are naturally weak and delicate—unfortunately the periods are oftener and continue longer, and after a time they are renewed by any bodily exertion or mental emotion, so that a constant drain exists. If the flow of blood is not continuous, leucorrhea intervenes. The patient gradually loses strength and becomes languid, her face is pale and usually bloated, livid circles appear around the eyes, the appetite is impaired, the bowels are constipated, and the feet and ankles swollen. Lack of blood in the brain is indicated by headache, ringing in the ears, and dizziness. The patient is nervous and irritable, being disturbed by the slightest noise, and the heart palpitates after the least exertion.

**Causes.** The *first* form is caused by eating too much rich and highly-seasoned food, drinking wine, porter, ale, or beer, want of exercise, in brief, whatever induces plethora; the *second* results from an insufficient or poor diet, leucorrhea, frequent abortions, want of ventilation, inherent feebleness, and whatever depresses the vital powers. Either form may be due to syphilitic taints, excessive sexual indulgence, accidents of pregnancy, or organic diseases of the womb. The morbid affections of the womb most likely to induce menorrhagia are

granular ulceration of its mouth and neck, fungous degeneration of its lining membrane, and tumors within that organ. As these subjects are severally considered on other pages we shall here dismiss them with this brief notice.

Profuse menstruation is very prone to occur in young women of a lymphatic temperament, whose organs are sleazy in texture.

**Treatment.** To control the excessive flow, the patient should remain in bed, and assume the recumbent position until the period is passed. If circumstances prevent strict compliance with this rule, it should be observed as nearly as possible. Warmth should be applied to the feet, and cold clothes, which ought to be removed as soon as they become warm by the heat of the body, should be repeatedly placed upon the back and abdomen. A strong tea made from cinnamon bark, or witch-hazel leaves or bark, taken freely, will prove very efficacious in checking the flow. The fluid extract of ergot, in doses of from half a teaspoonful to a teaspoonful, in a little water or cinnamon tea, is one of the most effectual remedies in this affection. Another valuable remedy for arresting menorrhagia is an infusion of Canada fleabane; or the oil of this plant may be administered in doses of from five to ten drops on sugar. Gallic acid is also a good styptic to employ in these cases. If there is febrile excitement, a hard pulse, frequent and throbbing, and if there is headache, thirst, parched lips, hot and dry skin, as is sometimes the case, then menorrhagia is due to an augmented action of the heart and arteries, and the indication of treatment is to diminish vascular action. This may be temporarily accomplished by the use of *veratrum viride*, which should be continued until the flow is sufficiently diminished.

The means already suggested will generally prove effective in controlling the inordinate flow at the time. Treatment that will produce permanent relief should then be adopted. The condition of the skin, kidneys, and bowels, requires attention for noxious elements should not be retained in the system. To give tone to weakened pelvic organs we know of nothing more specific in its effects than Dr. Pierce's Favorite Prescription, which is sold by druggists. It should be taken continuously for weeks, in order to fully correct the extremely weakened condition of these organs. It also aids nutrition, and thus tones up the general system, so that in the form of profuse menstruation, resulting from debility, the patient is strengthened, her blood enriched, and her nervousness quieted, which constitutes the necessary treatment to make the cure permanent.

As women approach the critical age, and menstruation ceases, if they are anæmic, their condition is pitiable. This period is popularly denominated the *turn of life*. Under favorable circumstances, the vitality is decidedly enhanced, and the decline of this function is attended with a revival of the bodily powers. But when the crisis has been preceded by excessive labor, when intemperance or excesses of any kind have deranged the bodily functions and perverted nutrition, when the mind has been long and deeply depressed, or when the insidious progress of disease of the heart, liver, or other important organs occurs in consequence of irregularities of living, then there is danger of congestion of the uterus and a protracted and profuse menstrual flow which favors a decline.

The treatment of this form of menorrhagia does not differ from that already suggested. The diet should be light and nourishing, and daily exercise, walking, riding, change of air and scenery, all will contribute to restoration. Especial attention should be directed to the condition of the bowels and liver. If the latter be deranged, Dr. Pierce's Golden Medical Discovery will be a most efficacious remedy. When there is a diminution of vital force, resulting in impaired nutrition and disorders of blood, an alterative is required which will insensibly and gradually restore activity. Impairment of nutrition is very frequently associated with functional or organic disease of the liver. Whenever innutrition depends upon depravation of the blood or torpor of any of the secretory organs, the "Golden Medical Discovery" will prove to be an invaluable remedial agent, for it is an alterative and at the same time a blood restorative. If the bowels be costive small laxative doses of Dr. Pierce's Pleasant Pellets should be employed. The "Favorite Prescription" regulates the menstrual function by toning up the tissues of the uterus and restraining the escape of the menses from the orifices of the blood-vessels. While the diet should be nourishing, consisting of wild game, mutton, chicken, and wine, the patient ought not to debilitate the stomach by the use of strong tea or coffee. The circulation of the blood should be quickened by riding, walking, exposure to sunlight, and fresh air. The patient should engage in some light occupation, in which the mind will be constantly as well as agreeably employed, but not overtaxed. By pursuing the course of treatment, invalids suffering from menorrhagia may be permanently restored to health.

## THE TURN OF LIFE.

(CESSATION OF THE MENSES.)

Menstruation commonly occurs at regular monthly intervals, during a period of about thirty years. The time for cessation depends somewhat upon the date of its first appearance. In the temperate zones it commences at about the fifteenth year, and, consequently should terminate at the forty-fifth year. Instances are common, however, in which it has been prolonged until the fiftieth and even to the fifty-fifth year. In warm climates it commences and terminates at an earlier age.

As women approach the critical period of life, if the general health and habits be good, the discharge may gradually diminish, and, at length, totally disappears, without producing any particular inconvenience, but this seldom happens. More frequently, the discharge is entirely absent for six or seven weeks, and when it does return, it is more copious than usual. In some cases, the flow is not only too profuse, but too frequent. Many months may elapse before the menses return, and, even then they are apt to be very pale and deficient in quantity.

The fluctuations of this function occasion irregularities and disturbances of the general health. When the flow of blood is diverted from the uterus, it is liable to be directed to the head or some other part of the body. In fact, there appears to be constitutional agitation and disorders of all the organs. Perhaps one reason for calling this a critical period is that if there is a morbid tendency in the system, a disposition to develop tumors of the breast or uterus, these are very liable to make rapid progress at this time, since they are not relieved by the customary local exudation of blood. It is a time favorable to the awakening of latent disorder and morbid growths, for, at the decline of the menstrual function the uterus is not so capable of resisting vitiating influences.

There is greater liability to irritation of the bladder and rectum, and the menstrual flow may be superseded by a white, acrid discharge caused by inflammation of the mucous membrane of the vagina. Even if the system be not enfeebled by excessive losses of blood, debility may result from a continued

irritation of the uterine organs and cause the morbid discharge. The nervous system sympathetically responds, becoming exceedingly irritable, and thus implicating in this derangement every bodily organ. In some constitutions the change of any habit is almost impossible, particularly if it is improperly acquired, or detrimental to health; and so respecting this function we have sometimes thought that the more it has been abused and perverted during the time of its natural activity, the greater is the disturbance occasioned when it ceases.

**Treatment.** There should be regularity in all the habits of life. Women are too apt to approach this important period without due care and consideration. When the physical system is about to suspend a function it is folly to endeavor to perform the labor or assume the responsibilities which were permissible when the constitution was more robust.

How the duties of each day and hour weigh upon the energies of the mother! What intense solicitude and yearning she experiences! How unselfish is that mother who each day works steadily and faithfully for others and who is conscious of the hidden dangers that lurk around her pathway! With confiding faith and love she commends the interests of her children to Him who doeth all things well. She anticipates the wants of her family and strives to supply the desired comforts thus wasting her strength in the labors prompted by her loving nature. Would it not be a greater comfort to those children to have the counsel of their dear mother in later years than to have the bitter reflection that she sacrificed her health and life for their gratification?

Unconsciously, perhaps, but none the less certainly, do women enter upon this period regardless of the care they ought to bestow upon themselves. Without sufficient forethought or an understanding of the functional changes taking place, they over-tax their strength, until, by continuous exertion, they break down under those labors which to persons of their age are excessive and injurious. Is it strange when woman has thus exhausted her energies, when her body trembles with fatigue and her mind is agitated with responsibilities, that the menses capriciously return, or the uterus is unable to withstand congestion, and capillary hemorrhage becomes excessive? If the physical system had not

been thus exhausted, it would have exercised its powers for the conservation of health and strength. It is better to be forewarned of the ills to which we are liable, and fortify ourselves against them, rather than squander the strength intended for personal preservation. Let every woman, and especially every *mother*, consider her situation and properly prepare for that grand climacteric, which so materially influences her future health and life.

The general health should be carefully preserved by those exercises which will equalize the circulation of the blood, and the regular action of the bowels should be promoted by the use of those articles of diet which contribute to this end. Relieve the mind of responsibility, keep the skin clean, and enrich the blood with tonics and alteratives. For the latter purpose, use Dr. Pierce's Favorite Prescription and "Golden Medical Discovery." If these remedies fail, seek professional advice. A careful regulation of the habits, strict attention to the requirements of the system, and the use of tonic medicines, will very frequently render the employment of a physician entirely unnecessary.

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## LEUCORRHEA.

(“WHITES.”)

Leucorrhea is the symptomatic manifestation of some uterine or vaginal affection, vulgarly called “whites.” We say *symptomatic*, for the white or yellowish discharge, which we term leucorrhea, is not a disease, but a symptom of some uterine or vaginal disorder. We call it a *white* discharge to distinguish it from the menses and uterine hemorrhages. It varies, however, in color and consistency from a white glairy mucus to a yellow or greenish, purulent, fetid matter. Sometimes it has a curdled appearance, at others, it is of the consistency of cream. Leucorrhea is the most common symptom of uterine derangement, and there are few females who are not affected by it at some period of life. It may originate either in the vagina or uterus, and it is accordingly termed either vaginal or uterine leucorrhea. The nature of leucorrhea is analagous to that of nasal catarrh. In a healthy state, the lining membrane of the genital organs secretes

sufficient mucus to moisten them; but, if the mucous membrane is temporarily congested or inflamed, the secretion becomes profuse, irritating, and offensive. Vaginal and uterine leucorrhœa are essentially different in character, the former being an acid, and the latter an alkaline secretion, and, while the first is a creamy, purulent fluid, the latter is thick and ropy, like the white of an egg. In fact, the latter discharge is rich in albuminous matter and blood-corpuscles, hence, its great debilitating effect upon the system, and, if not promptly arrested it is likely to produce *vaginitis*, *pruritus vulvæ*, or *vulvitis*.

**Vaginitis** is indicated by intense inflammation of the mucous membrane of the vagina. When this affection is present the patient experiences a sense of burning heat, aching and weight in the region of the vagina, violent and throbbing pains in the pelvis, and the discharge is profuse and very offensive. There is also a frequent desire to urinate, and the passage of the urine causes a sensation of scalding.

**Pruritus Vulvæ.** The discharge irritates the nerves of the external genital parts thus producing an almost unendurable itching. Scratching or rubbing the parts only aggravates the affection. The patient is tormented night and day, is deprived of sleep, and naturally becomes despondent. *Pruritus vulvæ*, in its severest forms, is often developed when the discharge is scarcely noticeable. It is the most common result or accompaniment of leucorrhœa.

**Vulvitis.** This term indicates an inflammation of the lining membrane of the external genital parts. Sometimes the inflammation extends to the deeper tissues, causing great pain, and even suppuration, resulting in the formation of an abscess. The attack is indicated by redness, swelling, and a feverish state of the affected parts, which is quickly followed by a profuse flow of yellow pus, and, in some instances, small ulcers are formed on the affected parts.

**Symptoms.** The sufferer from leucorrhœa becomes pale and emaciated, the eyes dull and heavy, the functions of the skin, stomach and bowels become deranged, more or less pain in the head is experienced, sometimes accompanied with dizziness, palpitation is common, and, as the disease progresses, the blood becomes impoverished, the feet and ankles are swollen, the mind is

apprehensive and melancholy, and very frequently the function of generation is injured, resulting in complete sterility. Exercise produces pain in the small of the back and the lower portion of the spine, and, owing to a relation of the vaginal walls, the womb falls far below its natural position, or turns in various directions according to the manner in which the weight above rests upon it. Ulcers are apt to appear upon the mouth of the womb, the matter from which tinges the discharge and stains the linen. Hysteria is often an attendant of this disease.

**Causes.** The immediate cause of leucorrhœa is either congestion or inflammation of the mucous membrane of the vagina or womb, or both. The exciting causes are numerous. Among others deranged menstruation, prolonged nursing of children, pregnancy, abortions, excessive indulgence in sexual intercourse, uncleanliness, piles, uterine ulcers and displacement of the womb, are the most common. In brief, it usually accompanies every uterine disorder which vitiates and reduces the system. During childhood, particularly in scrofulous children, discharges from the vagina are not infrequent, owing to worms or other intestinal irritation.

Among the organic causes of leucorrhœa are ulceration of the mouth or neck of the womb and tumors, which are elsewhere considered.

**Treatment.** We have dwelt upon leucorrhœa because of its prevalence and in order to exhibit the various forms it may assume. These reasons long ago prompted us to investigate it; and ascertaining the derangement to consist in a relaxation of the walls of the vagina, attendant upon depressed vitality, for many years we experimented with various medicines to find those that would exercise specific properties in restoring the tissues involved to a natural condition, thereby arresting the abnormal discharge. Our efforts in that direction have been very successful and our expectations more than realized. The treatment which we shall recommend is rational, based upon the pathological conditions of the disease, and has been attended with the greatest success.

It embraces the use of those general restoratives and specific uterine tonics, so harmoniously combined in Dr. Pierce's Favorite Prescription, a remedy which has achieved unparalleled success in

the cure of this affection and won the highest praise from thousands of grateful women. In many cases it is well to accompany its use with alterative treatment, for which the "Golden Medical Discovery" will be found especially effective. It is an absurd practice to arrest the discharge with astringent injections *alone*. The weak and lax walls of the vagina, as well as other tissues of the system require strength, and this can be gained only by the use of general and special tonics. Appropriate injections as *auxiliary* treatment will very much *assist* in the cure. The "Favorite Prescription" is a special tonic for the affected parts, and the "Golden Medical Discovery" is the best general alterative of which we have any knowledge. They may be taken in alternate doses every day. If the patient is very pale and anæmic one or two drachms of the pyrophosphate of iron may be added to each bottle of the "Favorite Prescription."

The functions of the skin should be kept active by frequent baths, and the patient, if able, should walk or ride in the open air and freely expose herself to the sunshine. If the invalid be too weak to exercise much, she should go out in warm weather and sit in the open air. Sunshine is no less important in maintaining animal, than in supporting vegetable growth and health. The human being, like the plant, sickens and grows pale, weak and tender, if secluded from the sunlight. The apartments occupied should be thoroughly ventilated. Many women are sickly and feeble because they live in badly ventilated rooms.

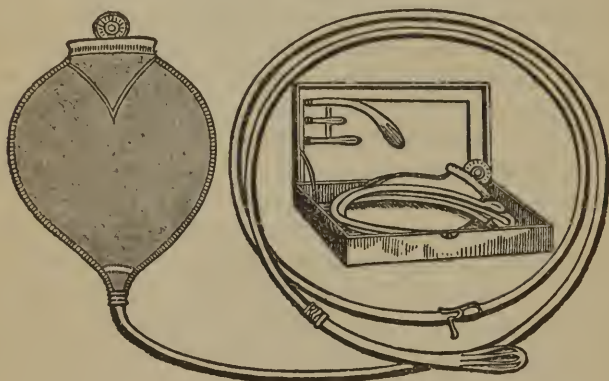
We cannot too strongly urge in this, as in all other chronic diseases peculiar to women, that the bowels be kept regular. Frequent, but small doses of Dr. Pierce's Pleasant Pellets will prove most beneficial. If the vaginal passage is tender and irritable, an infusion, or tea of slippery-elm bark is very soothing, and may be used freely with a vaginal syringe. Whatever injection is employed should be preceded by the free use of Castile soap and warm water to thoroughly cleanse the parts. One part of glycerine to six parts of water is a soothing lotion when there is much tenderness, heat, and pain in the vagina. If there be no great tenderness in the vagina, or if the acute inflammatory symptoms have yielded to the lotions already suggested then a tonic and astringent injection should be employed.

For this purpose a wash made by dissolving one of Dr.

PIERCE'S PURIFYING AND STRENGTHENING LOTION TABLETS, in one pint of hot water is a superior application and will not fail to be of great benefit in controlling the disagreeable drain. If your medicine dealer is not supplied with these, mail 35 cents in one-cent stamps to us and we will forward a box of the "Lotion Tablets" by return post.

These "Lotion Tablets" have for many years been used in the treatment of obstinate cases of leucorrhœa at the Invalids' Hotel

*Fig. 13.*



FOUNTAIN SYRINGE.

and Surgical Institute and their efficiency has been alike gratifying to both patient and physician.

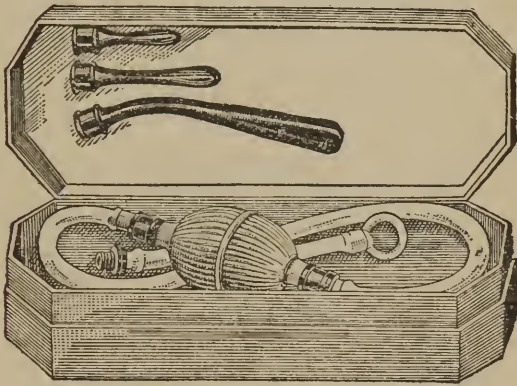
If *pruritus* or severe itching, be also a symptom, the itching will readily yield if the parts be cleansed with Castile or other fine soap and warm water, followed by the application of a compound composed of two ounces of glycerine, one ounce of rose-water, and one drachm of sulphite of soda; or, for the sulphite of soda, two drachms of borax may be substituted. The following lotion is a good one to relieve *pruritus*: sugar of lead, one-half drachm; carbolic acid, 8 or 10 drops; laudanum, one ounce; glycerine, one ounce; water, one pint; mix. This may be applied to the itching parts, and also injected into the vagina.

**How to Use Vaginal Injections.** We usually recommend the Fountain Syringe illustrated in Fig. 13, as the most convenient instrument for administering vaginal injections. The

fountains supplied by us are of soft rubber, and have extra nozzles, with which to make rectal or nasal irrigations. There is also a large, long nozzle for vaginal injections. It is channeled so as to permit the free clearing away of the secretions as the douche is employed. The Fountain Syringe can be used without assistance, the flow of fluid is gradual, and with a force that can be varied, by raising or lowering the reservoir, yet is never so great as to be liable to produce injurious effects.

The syringe usually sold with small nozzles or pipes is of little

*Fig. 14.*



SOFT RUBBER-BULB SYRINGE.

or no value for vaginal injections. In many instances so small a tube will pass readily into the canal of the uterus, and hence there has frequently resulted an injection of a portion of the fluid into the uterus itself, producing severe pain. It is important, therefore, in using the Vaginal Douche to employ only a large tube that has grooves in its surface for the free clearing away of the fluid as it runs from the fountain.

Where it is desired to obtain relief from a congested, inflamed or sensitive and irritable state of the mucous surface, the employment of a large quantity of water as hot as it can be borne, is of the greatest remedial value. It rapidly diminishes the size of the blood-vessels, and aids in bringing about a normal circulation in the parts.

As a rule, in taking the douche with the Fountain Syringe

the rubber bag is filled, and suspended from a nail or hook at a height of from two to five feet above the patient, and the fluid passes through the tube by force of gravity, thus requiring no muscular exercise. The force of the stream depends upon the height of the fountain above the outlet nozzle. It is only necessary that the patient should assume a comfortable position where the fluid which comes from the vaginal canal can flow into a water closet, or any convenient vessel.

After a thorough cleansing of the vaginal surfaces of mucus, by means of the warm or hot water it is sometimes advisable to inject remedial fluids. These injections may readily be made with the fountain or bulb syringe, introducing not less than from two to four ounces. This may be retained sufficiently long to exert its remedial effects upon the mucous surface, which usually takes from five to eight minutes. The hips should be elevated, and the nozzle of the syringe surrounded by a napkin or other similar material upon which moderate compression can be made so as to retain the fluid in the vagina for the necessary period.

When suffering from any uterine trouble, it is necessary to avoid severe fatigue. The amount and character of exercise should be suited to the condition of the patient; while most important of all, the strictest abstinence from sexual intercourse should be observed.

To those who are unable readily to obtain the Fountain Syringe above recommended we will send one of these instruments by mail, post-paid, on receipt of \$2.25.

A Soft Rubber-bulb or Pump Syringe (illustrated in Fig. 14) will be sent post-paid, for \$1.00 or \$1.75 the price varying with the quality and case. These syringes have tubes for both adults and children.

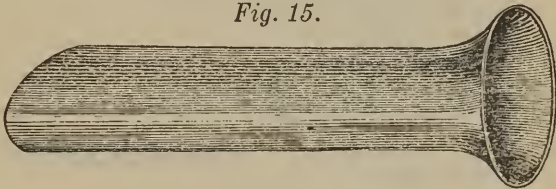
## ULCERATION OF THE UTERUS.

Ulceration is the process by which ulcers, or sores, are produced. It is characterized by the secretion of pus or some fetid discharge and is continued as a local disease through the operation of constitutional causes. It is generally a symptom of other morbid conditions.

Ulcers may form in the *mouth* or *neck* of the uterus, and omitting cancerous ulcers and those of a syphilitic character may be classified as *Granular* and *Follicular*.

**Granular Ulcer.** This variety of ulcerative degeneration is the most frequent, and may exist for some time without

*Fig. 15.*



The Ferguson Speculum.

exciting any suspicion in the mind of the patient that she is afflicted with any such morbid condition. There is local inflammation, and the mouth of the uterus is uneven, rough, and granular. If an examination be made with the speculum, the mouth of the uterus is often found in a highly inflamed condition.

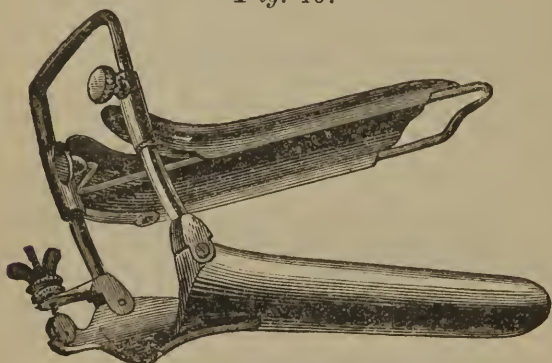
Figs. 15 and 16 represent two different forms of specula. The one represented by Fig. 15 consists of a tube of glass coated with quicksilver and covered with India rubber, which is thoroughly varnished. That represented by Fig. 16 is made of metal and plated. By using one of these instruments the condition of the mouth of the womb can be distinctly seen.

**Follicular Ulcer.** When the mucous follicles of the neck of the uterus are inflamed they enlarge and become filled with a fluid having the color and consistency of honey. This secretion, because of the presence of the inflammation, is

not discharged. The follicles, therefore, continue to enlarge until they burst, and we then see in their place the red, elevated, angry-looking eminence, which is called a *follicular ulcer*.

**Symptoms.** The severity of the symptoms depends upon the character of the ulceration. It may be simple or associated with purulent leucorrhea and hemorrhage. If ulceration be slight and local, few symptoms will be present; but if it be

*Fig. 16.*



An Expanding Uterine Speculum.

associated with uterine debility, congestion and inflammation of the mucous membrane of the uterus, the discharge will be profuse, and there will be fixed pain in the back and loins, a bearing-down sensation, and great difficulty in walking. The discharge is weakening, as it impoverishes the blood, and thus reduces the strength.

**Causes.** Ulceration may be induced by any thing that excites inflammation of the lining membrane of the mouth and neck of the uterus. The use of pessaries, excessive sexual indulgence, injuries occasioned by giving birth to children, congestions, enlargements or displacements, may operate as causes.

**Treatment.** We can not too strongly condemn the practice so popular at the present time with physicians generally, of indiscriminately burning all uterine ulcers with strong caustics, such as nitrate of silver, chromate of potassium, and other similar escharotics, regardless of the condition of the general system. Ulcers of the womb must be healed in the same manner as those

upon any other part of the body. It is an irrational practice to repeatedly cauterize them, expecting thereby to promote healing, while the system is vitiated and the vitality far below the standard of health. Enrich the blood, tone up the system, keep the ulcers cleansed by the frequent use of lotions, and they will generally heal. Caustics often aggravate the irritability and interfere with the healing processes of nature. Women should not unnecessarily submit to the exposure of their persons. If they perseveringly employ the treatment which we shall suggest, other local treatment will *very rarely* be found necessary. This modern warfare which physicians are waging upon the unoffending womb is a most irrational practice. Our grandmothers got along very well without exposing themselves to the humiliation and tortures of this new-born empiricism. We do not wish to be understood as undervaluing or denying the necessity, in rare cases, of examinations of the uterus, or as being unappreciative of the aid afforded in such investigations by the speculum, and the beneficial effects of local applications made directly to the womb through that instrument. What we affirm is, that such examinations and applications are, in the practice of most modern physicians, made unnecessarily frequent, resulting many times in lasting injury to the patient.

**General Means.** As has already been indicated, constitutional treatment should be principally relied upon to cure ulceration of the neck of the womb. Put the system in perfect order and the local ulceration cannot fail to heal. If you have a sore or ulcer upon the leg you very naturally reason that there is a fault in the system at large or in the blood. You do not apply caustics to the sore, but you go to work to restore the blood and system to a normal or healthy condition and as soon as this is accomplished the open and rebellious sore, or ulcer, heals of its own accord. All you have to do locally, to stimulate the ulcer to heal, is to keep it well cleansed by the use of Castile soap and warm water. Just so with ulceration of the womb. Thoroughly cleanse the vagina and neck of the womb once a day by the use of warm water and a little soap, applying this *thoroughly*, as fully described under the head of *treatment for leucorrhea*, by using a solution of Dr. Pierce's Purifying and Strengthening Lotion Tablets as there directed. After thus thoroughly

cleansing and purifying the parts, a piece of soft sponge as large as a hen's egg, to which a bit of cord or strong thread is attached to facilitate removing it, may be thoroughly wet in pure glycerine and introduced into the vagina, pressed against the mouth of the womb, and allowed to remain there for twelve hours, when it should be gently removed by pulling on the attached string. The cleansing lotion of soap and warm water should be used daily and followed by the glycerine application.

Every third night instead of the glycerine tampon, apply one of Dr. Pierce's Antiseptic and Healing Suppositories, pressing it well up against the mouth of the womb, and letting it remain there to slowly dissolve. This will give far better curative results than the application of nitrate of silver or other caustics so generally used by physicians. Besides it has the great advantage of being entirely harmless in any condition of the parts to which it is applied. These "Suppositories" are powerfully antiseptic, destroying all offensive odors and have a soothing and at the same time a tonic or strengthening effect upon the neck of the womb and the vagina.

In cases where there is prolapsus or falling of the womb, or anteversion or retroversion, or other displacements the use of the "Antiseptic and Healing Suppositories," will be found to be of great benefit in giving strength to the supports of the womb and its appendages.

If your dealer is not supplied with the "Suppositories," inclose thirty-five cents to us at Buffalo, N. Y., and a package will be sent you, postpaid.

We are fully aware that this thorough and *systematic* course of treatment is slightly troublesome in its application, but what system of treatment that can promise similar success is not?

This course of treatment must be *rigidly* adhered to for several weeks before we can expect a complete cure of the ulcers and the arrest of the consequent leucorrhœal discharge.

**The Sheet Anchor of Hope.** Do not fail to bear in mind that no matter how good the lotions and other local applications may be, your *chief* reliance in all cases of ulceration of the womb, as well as in those of simple leucorrhœa, must be upon *thorough constitutional* treatment. To this end Dr. Pierce's Golden Medical Discovery should be taken three times a day in

doses of from one to one-and-a-half teaspoonfuls one hour before each meal, and in the middle of the forenoon, in the middle of the afternoon, and just before retiring for the night, a like amount of Dr. Pierce's Favorite Prescription should be taken. The use of these blood cleansing and invigorating tonic medicines should be kept up *persistently* for several weeks; for you must not expect a perfect cure too soon in a malady that has become chronic and seated. The disease does not become established hastily, but is slow in its inception and progress, and will only gradually and slowly yield to the best of treatment, which we believe we have already pointed out. Followed *earnestly, faithfully* and *persistently*, the use of the means which we have suggested will rarely, if ever, fail.

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## MEDICAL TREATMENT.

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An imaginative poet avers that woman is the link connecting heaven and earth. True it is, we see in her the embodiment of purity and heavenly graces, the most perfect combination of modesty, devotion, patience, affection, gratitude and loveliness, and the perfection of physical beauty. We watch with deep interest the steady and gradual development from girlhood to womanhood, when the whole person improves in grace and elegance, the voice becomes more sonorous and melodious, and the angles and curvatures of her contour become more rounded and amplified, preparatory for her high and holy mission.

The uterus, or womb, and ovaries with which her whole system is in intimate sympathy, render her doubly susceptible to injurious influences and a resulting series of diseases, from which the other sex is entirely exempt. By their sympathetic connections they wield a modifying influence over all the other functions of the system. Physically and mentally woman is man modified, perfected—the last and crowning handiwork of God. When, therefore, this structure so wonderfully endowed, so exquisitely wrought and performing the most delicate and sacred functions which God has ever entrusted to a created being, is disturbed by disease, when the nicely-adjusted balance of her

complex nature deviates from its true and intended poise, the most efficient aid should be extended, in order that the normal equilibrium may be regained, her health restored and her divine mission, on which human welfare so largely depends, be fulfilled. Its importance should elicit the best efforts of the highest type of mind, the ripe development of genius, and the most scientific administration of the choicest, rarest, and purest medicinal elements in the whole range of nature.

**A Vast Experience.** As the remedial management of diseases of women has entered very largely into our practice at the Invalids' Hotel and Surgical Institute, located at 663 Main Street, Buffalo, N. Y., comprising the treatment of many thousands of cases annually, we have for many years had ample opportunities to so perfect our practice and so improve our remedies that it has enabled us to meet all requirements with increased *certainty* and *exactness*.

**Treating the Wrong Disease.** Our improved and perfected system of diagnosing, or determining the *exact* nature and extent of chronic affections, which, in most cases, we are able to do at a distance, and without a personal examination of the patient, as will be more particularly explained elsewhere, has enabled us to avoid the blunders so often committed by the general practitioner, who not infrequently treats for long weeks, and perhaps months, those afflicted with chronic ailments peculiar to women, without ever discovering their real and true disease, or condition. Thus, invalid women are often uselessly subjected to treatment for dyspepsia, heart disease, liver or kidney affections, sick headaches, and various aches and pains, as if they were *primary* diseases, when in reality, they are only so many local manifestations, or *symptoms*, of some over-looked derangement, or disease, of the womb. For, as we have already intimated, every organ of the system is in *intimate* sympathy with the uterus, or womb. Any disease, either functional or organic, of this organ, is at once manifest through several, if not all, the sympathizing organs of the system. When we receive a sharp blow upon the elbow, the pain is felt most keenly in our little finger. Just so in diseases of the womb; often the most distress is felt in organs or parts of the system quite distant from the real seat of disease.

On this account, thoughtless, easy-going and ignorant physicians are misled, and very commonly mistake the invalid's disease for some affection of the stomach, heart, liver, kidneys, or other organ, when really it is located in the uterus. Cure the disease of the womb, and all these disagreeable manifestations, or symptoms, vanish. Their cause being removed, the various dependent derangements and disagreeable nervous sensations and sufferings rapidly give way, and vigorous health is firmly re-established.

**Time and Perseverance in Treatment are Required.** Most chronic diseases of women are slow in their inception, or development, and their removal or cure must necessarily be gradual. Disease that has been progressing and becoming more firmly established for months, or perhaps years, cannot, except in rare cases, be hastily dislodged, and the system restored to perfect health. The process of cure, like the development and progress of the disease, must be a gradual one, accomplished step by step. Often, too, the use of medicines that, if *persisted* in, will prove beneficial and curative, will, for a considerable time, arouse in the system very disagreeable sensations, and many times this leads unthinking persons to become frightened or discouraged, and to quit the treatment best adapted to their cases if only faithfully carried out. In many forms of womb disease, there are organic lesions or changes, that can be repaired only by a gradual process, just as an external wound would heal,—not suddenly, but by a constant, slow filling in and building up, or by the gradual development or growth of one cell upon another. Just as a great breach in a wall would be repaired by filling in brick upon brick, until the defect is effaced, so must these lesions be removed by gradual processes. When fully repaired, the dependent, sympathetic derangements, disagreeable sensations, and all the long train of consequential symptoms are, one by one, abolished.

**Not Limited in Our Remedial Resources.** It should be borne in mind that, while we recommend, in this little volume, certain courses of treatment for ordinary cases, the remedies mentioned do not by any means embrace all our resources in the way of medicines and other curative agencies, especially for complicated, difficult, or very obstinate cases. In many of the latter class we can send medicines that are exactly adapted

to the case, if the invalid will fill out an "Application for Treatment," which may be found folded in this book, or which will be sent by mail to any address, upon request. In most womb diseases, the chemical and microscopical examination of the urine also furnishes valuable aid in determining the exact condition of the patient, as well as the precise stage of the local organic disease. Full directions for sending such samples are to be found in the "Appendix."

Every case submitted to Dr. Pierce's Invalids' Hotel, either by letter or in person, receives the careful and deliberate consideration of a full Council of specialists before a decision as to the nature of the malady, or the proper course of treatment to be employed, is determined upon. The great advantage of this system of practice must be obvious to every intelligent, thoughtful person. No experimenting is ever resorted to. The treatment is *speci-ally* and *exactly* adapted to each individual case, requiring such judgment, skill and nicety of discrimination, as could only be acquired by our specialists through long and diligent study, and an experience embracing the treatment annually of many thousands of cases of the chronic diseases which are peculiar to women.

DR. PIERCE'S INVALIDS' HOTEL,  
665 Main Street, Buffalo, N. Y.

## TONICS.

**Doctor Pierce's Favorite Prescription.** The "Favorite Prescription," in addition to other properties, possesses tonic properties. The mere mention of the ingredients is sufficient proof of this, but we will go a step farther and note the opinions of authors, and submit short extracts from the dispensaries.

The "Favorite Prescription" is made principally of Oregon Grape root, Lady's Slipper root, Black Cohosh root, Unicorn root, Blue Cohosh root and Viburnum. We will consider them in the same order.

**Oregon Grape root** (*Berberis Aquifolium*). KING'S AMERICAN DISPENSATORY by H. W. FELTER, M. D. and JOHN U. LLOYD, P. H. D., says: "This agent has justly been extolled as an alterative and tonic, and has been recommended in salt-rheum and other cutaneous affections,

as well as in maladies supposed to be due to some mal-condition of the blood. Excretion and secretion are promoted by it; digestion and assimilation improved; the lymphatic glandular system and the ductless glands are stimulated; and the renal secretions somewhat augmented. Thus it acts as a blood-maker, and is therefore a remedy to oppose depraved conditions of the body-fluids. As a tonic, it may be employed as a synonym of *hydrastis*, *berberis*, etc., possessing in addition its own peculiar virtues, in dyspeptic conditions, chronic mucous maladies, and in certain enfeebled conditions of the system," etc.

THE UNITED STATES DISPENSATORY says of Oregon Grape root: "Strongly recommended by various clinicians as alterative, laxative, tonic, and diuretic." Very useful in scrofulous affections, in chronic skin diseases (especially of the scaly type), in the convalescence from malaria and other fevers, and in chronic uterine disease.

**Lady's Slipper root** (*Cypripedium Pubescens*). "This root is valuable in all cases of *nervous excitability* or *irritability* unconnected with organic lesions, allaying the irritability, lessening any accompanying pain, producing a more calm and cheerful condition of the body and mind, and consequently favoring mental tranquility, or sleep. Hence it has been of service in *hysteria*, *chorea*, *nervous headache*, *wakefulness* and *prostration in low fevers*, *epilepsy* from reflex irritation, and, indeed, in all cases of morbid irritability of the nervous system from functional derangement or reflex irritation. It will be found very efficient in the *nervousness*, *hypochondria*, or *mental depression* accompanying certain forms of derangement of the digestive organs, which is more generally met with among females."—Prof. JOHN M. SCUDDER.

"Exercises special influence upon *nervous conditions* induced by or depending upon disorders of the female genito-urinary organs; relieves pain where restlessness and nervousness are associated with headache or neuralgia; may be used in nervousness, restlessness with constant change of position, abnormal excitability, morbid sensitiveness of the eyes, irritation of the brain in young children with threatened convulsions."—F. ELLINGWOOD, M. D.

"Useful in hysteria, chorea (St. Vitus's dance), nervous headache, neuralgia and 'fidgetyness.' Is mild, but if used in excess increases irritability and weakness which it palliated."—EDWIN M. HALE, M. D.

**Black Cohosh root** (*Cimicifuga Racemosa*). "This is a very active, powerful and useful remedy, and possesses an undoubted influence over the nervous system. In small doses the appetite and digestion are improved. In the painful condition incident to imperfect menstruation, its remedial action is fully displayed. It is an efficient agent for the restoration of suppressed menses. In dysmenorrhœa (painful periods), it is *surpassed by no other drug*, being of greatest utility in irritative and congestive conditions of the uterus and appendages, characterized by tensive, dragging pains. Reflex mammary pains during gestation are met by it, and in rheumatic subjects it promptly relieves such ovarian troubles as ovaralgia and neuralgia. Its action is slow, *but its effects are permanent*. It has been used successfully as an antispasmodic in hysteria, epilepsy when due to menstrual failings, periodical convulsions, nervous excitability and many other spasmodic affections. For headache, whether congestive or from cold, neuralgia, dysmenorrhœa, or from la grippe, it is promptly curative. As a remedy for pain, Black Cohosh is a very prompt agent, often relieving in a

few hours painful conditions that have existed for a long time."—KING'S AMERICAN DISPENSATORY.

"Of unquestionable value in chorea (St. Vitus's dance). Promptly cures urticaria (hives). Recommended in rheumatism and chronic bronchitis."—HORATIO C. WOOD, M. D.

"Is an excellent stomachic tonic and expectorant. In phthisis to moderate hectic (fever), to improve appetite and to facilitate expectoration it is undeniably of service; safer than digitalis in dilated heart, fatty heart, languid circulation, oppressed breathing and general dropsy. Most favorable reports have been made of its use in disorders affecting the muscular system. The greatest success of this drug has been achieved in chorea (St. Vitus's dance). Is useful in disorders or perversions of the menstrual flow."—R. BARTHOLOW, M. D.

"Indicated in muscular aching, in hysteria with flushed face and nervous excitement. Professor KING advised it in coughs on account of its influence upon the nerve centers. As a remedy for chorea it has become widely popular. Is indicated in rheumatic neuralgia and sciatica, in dysmenorrhœa (painful menses), to relieve irregular pains and uterine distress during the course of pregnancy, in spasmodic stricture, in spermatorrhœa and orchitis."—F. ELLINGWOOD, M. D.

**Unicorn root** (*Helonias Dioica*). The American Dispensatory (prepared by Professors KING and SCUDDER), says: "*Helonias*, or Unicorn root, has been found very beneficial in *dyspepsia*, *loss of appetite*, and for the removal of *worms*. In diseases of the uterus (womb), it is one of our most valuable agents, acting as a uterine tonic, and gradually removing abnormal conditions, while at the same time it imparts tone and vigor. Hence, it is much used in *leucorrhœa amenorrhœa*, *dysmenorrhœa* and to remove the tendency to repeated and successive *miscarriages*. A particular phase removed by it is the irritability and despondency that often attends uterine troubles. In painful menstruation it has been found especially adapted to those cases in which there is pelvic fullness a sensation as if the womb and rectum were distended with blood, and the aching, bearing-down organs feel *as if they would fall out of the body*. Its action here is very decided. It is considered useful by some for the relief of the *vomiting of pregnancy*. *Helonias* is a decided tonic to the urinary tract."

"The most direct indication for the use of this agent is a dragging sensation in the extreme lower abdomen and inclination to pull up, to hold up or support the abdominal pelvic contents. Advised for women suffering from pelvic engorgement (fullness of lower abdomen) and uterine prolapsus (falling of womb). In addition it is a general tonic, improving the digestive and gastro-urinary apparatus."—F. ELLINGWOOD, M. D.

Dr. JOHN FYFE, Editor of the Department of Therapeutics in THE ECLECTIC REVIEW, says of Unicorn root: "In the treatment of diseases peculiar to women it is seldom that a case is seen which does not present some indication for this remedial agent. Unicorn root, through its tonic and alterative influence, acts equally well in amenorrhœa (suppressed menstruation) and in menorrhagia (flooding or profuse menstruation). It is especially called for in cases of amenorrhœa which are accompanied by general debility and an atonic (weak) condition of the digestive organs, as it increases the appetite and promotes digestion and assimilation. When there is a tendency to miscarriage its tonic influence will aid much in bringing about normal condition of the structures involved. In sterility and impotence its curative power is unmistakable, and within a

reasonable time it will restore to healthful activity all cases not dependent upon organic wrongs, and in leucorrhœa and defective menstruation it is a frequently needed remedy."

"The following are among the leading indications for Helonias: Pain or aching in the back, with leucorrhœa; constant sensation of heat in the region of the kidneys; menorrhagia (flooding), due to a weakened condition of amenorrhœa, arising from or accompanying an abnormal condition of the digestive organs and an anæmic (thin blood) habit; dragging sensations in the extreme lower part of the abdomen."

**Blue Cohosh root** (*Caulophyllum Thalioides*). The AMERICAN DISPENSATORY says: "Blue Cohosh is emmenagogue (excites menstrual flow), and its use as a parturifacient originated in the custom of the Indian squaws of employing a decoction of the root for two or three weeks previous to labor to facilitate child-birth."

Prof. JOHN KING, M. D., says: "Blue Cohosh when used by delicate women, or those who experience prolonged and painful labors, for several weeks previous to confinement, gives tone and vigor to all the parts engaged in the accouchment, facilitating its progress, and relieving much suffering." Prof. HALE testifies that women who have taken *Caulophyllum* previous to confinement, have over-run their time from ten to twelve days, but *all had very easy labors* and made good recoveries. Blue Cohosh acts as an anti-abortive by relieving the irritation upon which the trouble depends. He continues, "It has been employed to relieve *irritation* dependent on congestion. It controls chronic inflammatory states of the organs and gives tone in cases of debility. In the sexual disorders of the female it is indicated by tenderness and pain in the uterus. In debilitated patients, it has been very successfully used in cases of *hysteria* to overcome the attack, and to relieve *ovarian*, or *mammary pain*, or *irritation* when accompanying that disorder. *Chronic ovaralgia*, *uterine leucorrhœa*, *amenorrhœa* (*suppressed menstruation*) and *dysmenorrhœa* (*painful menstruation*), are conditions in which it has been most successfully employed. It has an established reputation as a remedy for *rheumatism of the uterus*, with nervous excitement, for *uterine cramps* attending menstruation, and for *menorrhagia* (flooding)."

"Is specific in spasmodic dysmenorrhœa (painful menstruation), after-pains and to prevent tedious and painful labors. Is a good preventive of premature labor and relieves pains in uterine displacements."—EDWIN M. HALE, M. D.

"From the end of the sixth month to the close of pregnancy is a period when many distressing symptoms are manifested, which may, in a measure, be relieved by *Caulophyllum*. The labor is less protracted, less painful and less liable to accidents. Recommended at the commencement of the menstrual period, in chronic uterine disorders, in painful menstruation, threatened abortion, nursing sore mouth, rheumatism, whooping cough, bronchitis."—F. ELLINGWOOD, M. D.

**Viburnum** A. C. COWPERTHWAIT, M. D., Ph. D., in his "Text-Book of Materia Medica and Therapeutics," says: "Viburnum has proved to be an invaluable remedy in dysmenorrhœa, especially of the congestive or neuralgic type, and often temporarily relieves in the membranous and obstructive varieties. It is a valuable remedy for after-pains, threatened abortion, intense cramp in uterus and bearing-down pain; or pain around from back, ending in excruciating pain in lower abdomen. Leucorrhœa. Has been used in hysteria, with painful menstruation. Spasmodic dysuria."

KING'S AMERICAN DISPENSATORY says of *Viburnum*: "Its principal use at the present day is in disorders of the female organs of reproduction. As an uterine tonic, it is unquestionably of great utility. It restores normal enervation, improves the circulation, and corrects impaired nutrition of these organs. In irritable condition of the uterus incident to highly nervous women, or as a result of over-work, it will be found an admirable agent. It is called for in weakened conditions of the body, with feeble performance of the uterine function. In dysmenorrhœa with deficient menses, uterine colic, and those cases where there are severe lumbar and bearing-down pains it will prove an efficient drug. It is specially indicated in cramps, like menstrual pains; pains decidedly expulsive, and intermittent in character, and in the various painful contractions of the pelvic muscles so common to disorders of women. Uterine congestion and chronic uterine inflammation are often greatly relieved by it. It acts promptly in spasmodic dysmenorrhœa, especially with excessive flow. It is a good remedy for uterine hemorrhage attending the menopause; in amenorrhœa, in pale, bloodless subjects the menses are restored by it. Cramps of limbs attending pregnancy yield to it. It is considered almost specific for cramp in the legs, not dependent upon pregnancy, especially when occurring at night. The condition for which it is most valued is threatened abortion. It is the most prompt drug in the *Materia Medica* to check abortion.

W. A. DEWEY, M. D., in "Practical Homeopathic Therapeutics, says of *Viburnum*: "Its key-notes are bearing-down, aching in sacral and pubic regions, excruciating cramp, colicky pains in hypogastrium, much nervousness and occasional shooting pains in the ovaries." Again, he says of it: "For threatening miscarriage, when pains come from the back around to the lower part of the abdomen and go into the thighs. It will often stop these spasmodic pains. It is a remedy to be used in frequent and early miscarriages."

"Farquharson's Therapeutics and *Materia Medica*," by FRANK WOODBURY, M. D., states that: "*Viburnum* is given for dysmenorrhœa. The fluid extract is a good preparation, and has a reputation for preventing threatened abortion."

"The National Standard Dispensatory," by H. A. HARE, M. D., says of *Viburnum*: "It has been used as a nervine, astringent, diuretic and tonic, and is said to possess a powerful influence as an uterine sedative and preventive of abortion."

The active medicinal principles of the several ingredients, or native, American roots employed, are extracted from each ingredient with the aid of special apparatus and appliances devised and built especially for carrying on the delicate and exact processes employed.

The foregoing are only a few brief quotations taken from amongst the voluminous endorsements which the several ingredients entering into Dr. Pierce's Favorite Prescription have received from the most eminent medical writers of *all* the different *schools* of medicine. After reading them can any reasonable person doubt that Dr. Pierce has selected and compounded his "Prescription" from the most valuable ingredients known to

the medical profession for the cure of those chronic diseases of women for which he recommends it?

"Favorite Prescription" is one of the medicines for women, the makers of which are not afraid to print the ingredients on the bottle-wrapper, thus taking their patrons into their full confidence. It is a medicine for women, every ingredient of which has the strongest possible endorsement of the most eminent medical practitioners and writers of our day, recommending it for the diseases for which "Favorite Prescription" is used. Dr. Pierce knew, when he first made this standard medicine, that whiskey and morphine were injurious, and so he has always kept them out of his remedies.

The use of "Golden Medical Discovery" with "Favorite Prescription" will be found of advantage in all the affections peculiar to women when complicated with great torpor of the liver, indigestion, kidney and bladder affections. The best way in such cases is to take the "Discovery" before meals and the "Prescription" half an hour, or such a matter, after meals and also just before retiring at night.

Dr. Pierce's Pleasant Pellets should also be taken moderately if very persistent constipation be present, but only in sufficient doses (probably only one or two daily) to *regulate* the bowels without producing their cathartic action. They act most favorably upon the liver. Their important ingredients are May Apple, (Podophyllin) Jalap, Aloin and Extracts of Nux Vomica and Stramonium in minute quantities, hence their anti-bilious properties.

**Iron** (*Ferrum*). Different preparations of iron are frequently prescribed by physicians. Dr. Pierce's Irontic Tablets are very valuable for thin-blooded people.

**"Irontic"** (*iron- tonic*) Tablets are composed of a soluble form of iron, nux and herbal extracts. After much experimentation in Dr. Pierce's Laboratory and testing out the best combinations of Iron for anæmic and thin-blooded persons, the Faculty of the Invalids' Hotel concurred in their verdict that Dr. Pierce's choice of a prescription which he called "Irontic" was the very best all-around tonic and blood-maker.

## CHAPTER XV

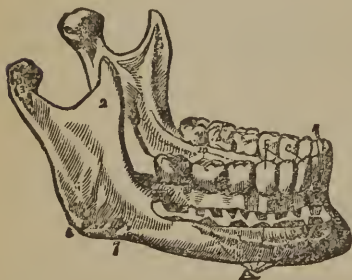
# PHYSIOLOGICAL ANATOMY.

### THE DIGESTIVE ORGANS.

*Digestion* signifies the act of separating or distributing, hence its application to the process by which food is made available for nutritive purposes. The organs of digestion are the Mouth, Teeth, Tongue, Salivary Glands, Pharynx, Esophagus, the Stomach and the Intestines, with their glands, the Liver, Pancreas, Lacteals, and the Thoracic Duct.

The *Mouth* is an irregular cavity, situated between the upper and the lower jaw, and contains the organs of mastication.

Fig. 26.



A view of the lower jaw. 1. The body. 2, 2. Rami, or branches. 3, 3. Processes of the lower jaw. m. Molar teeth. b. Bicuspids. c. Cuspids. i. Incisors.

It is bounded by the lips in front, by the cheeks at the sides, by the roof of the mouth and teeth of the upper jaw above, and behind and beneath by the teeth of the lower jaw, soft parts, and palate. The soft palate is a sort of pendulum attached only at one of its extremities, while the other involuntarily opens and closes the passage from the mouth to the pharynx. The interior of the mouth, as well as other

portions of the alimentary canal, is lined with a delicate tissue, called *mucous membrane*.

The *Teeth* are firmly inserted in the alveoli or sockets, of the upper and the lower jaw. The first set, twenty in number, are temporary, and appear during infancy. They are replaced

by permanent teeth, of which there are sixteen in each jaw; four incisors, or front teeth, four cuspids, or eye teeth, four bicuspid, or grinders, and four molars, or large grinders. Each tooth is divided into the crown, body, and root. The *crown* is the grinding surface; the *body*, the part projecting from the jaw, is the seat of sensation and nutrition; the *root* is that portion of the tooth which is inserted in the alveolus. The teeth are composed of dentine, or ivory, and enamel. The ivory forms the greater portion of the body and root, while the enamel covers the exposed surface. The small white

cords communicating with the teeth are the nerves.

Fig. 27.



The salivary glands. The largest one, near the ear, is the parotid gland. The next below it is the submaxillary gland. The one under the tongue is the sublingual gland.

The *Tongue* is a flat oval organ, the base of which is attached to the os hyoides, while the apex, the most sensitive part of the body, is free. Its surface is covered with a membrane, which, at the sides and lower part, is continuous with the lining of the

mouth. On the lower surface of the tongue, this membrane is thin and smooth, but on the upper side it is covered with numerous papillæ, which, in structure, are similar to the sensitive papillæ of the skin.

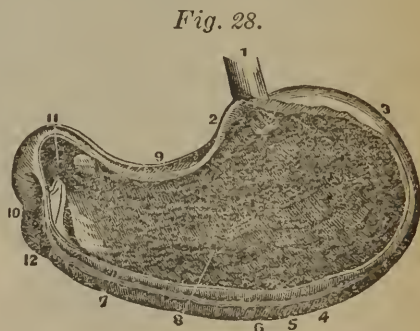
The *Salivary Glands* are six in number, three on each side of the mouth. Their function is to secrete a fluid called *saliva*, which aids in mastication. The largest of these glands, the *Parotid*, is situated in front and below the ear; its structure, like that of all the salivary glands, is cellular. The *Submaxillary* gland is circular in form, and situated midway between the angle of the lower jaw and the middle of the chin. The

*Sublingual* is a long flattened gland, and, as its name indicates, is located below the tongue, which when elevated, discloses the saliva issuing from its porous openings.

The *Pharynx* is nearly four inches in length, formed of muscular and membranous cells, and situated between the base of the cranium and the esophagus, in front of the spinal column. It is narrow at the upper part, distended in the middle, contracting again at its junction with the esophagus. The pharynx communicates with the nose, mouth, larynx, and esophagus.

The *Esophagus*, a cylindrical organ, is a continuation of the pharynx, and extends through the diaphragm to the stomach. It has three coats: First, the muscular, consisting of an exterior layer of fibers running longitudinally, and an interior layer of transverse fibers; second, the cellular, which is interposed between the muscular and the mucous coat; third, the mucous membrane, or internal coat, which is continuous with the mucous lining of the pharynx.

The *Stomach* is a musculo-membranous, conoidal sac, communicating with the esophagus by means of the cardiac orifice (see Fig. 28). It is situated

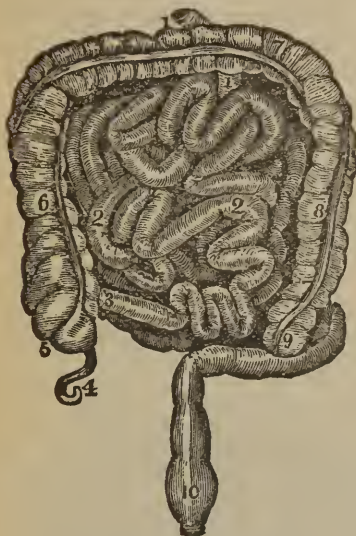


A representation of the interior of the stomach.  
1. The esophagus. 2. Cardiac orifice opening into the stomach. 6. The middle or muscular coat. 7. The interior or mucous coat. 10. The beginning of the duodenum. 11. The pyloric orifice.

obliquely with reference to the body, its base lying at the left side, while the apex is directed toward the right side. The stomach is between the liver and spleen, subjacent to the diaphragm, and communicates with the intestinal canal by the pyloric orifice. It has three coats. The peritoneal, or external coat is composed of compact, cellular tissue, woven into a thin, serous membrane, and assists in keeping the stomach in place. The middle coat is formed of three layers of muscular fibers: In the first, the fibres run longitudinally; in the second, in a circular direction; and in the third, they are placed obliquely

to the others. The interior, or mucous coat, lines this organ. The stomach has a soft, spongy appearance, and, when not distended, lies in folds. During life, it is ordinarily of a pinkish color. It is provided with numerous small glands, which secrete the gastric fluid necessary for the digestion of food. The lining membrane, when divested of mucus, has a wrinkled appearance. The arteries, veins, and lymphatics, of the stomach are numerous.

Fig. 29.



Small and large intestines.

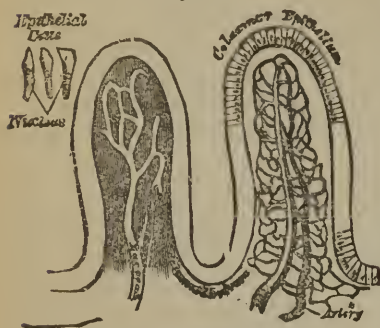
1, 1, 2, 2. Small intestine. 3. Its termination in the large intestine. 4. Appendix vermiformis. 5. Cæcum. 6. Ascending colon. 7. Transverse colon. 8. Descending colon. 9. Sigmoid flexure of colon. 10. Rectum.

The *Intestines* are those convoluted portions of the alimentary canal into which the food is received after being partially digested, and in which the separation and absorption of the nutritive materials and the removal of the residue take place. The coats of the intestines are analogous to those of the stomach, and are, in fact, only extensions of them. For convenience of description, the intestines may be divided into the *small* and the *large*. The small intestine is from twenty to twenty-five feet in length, and consists of the Duodenum, Jejunum, and Ileum. The *Duodenum*, so called because its length is equal to the breadth of twelve fingers, is the first division of the small intestine. If the

mucous membrane of the duodenum be examined, it will be found thrown into numerous folds, which are called *valvulæ conniventes*, the chief function of which appears to be to retard the course of the alimentary matter, and afford a larger surface for the accommodation of the absorbent vessels. Numerous *villi*, minute thread-like projections, will be found scattered over the surface of these folds, set side by side, like the pile of velvet. Each *villus* contains a net-work of blood-

vessels, and a lacteal tube, into which the ducts from the liver and pancreas open, and pour their secretions to assist in the

Fig. 30.



Villi of the small intestine greatly magnified.

The large intestine is about five feet in length, and is divided into the Cæcum, Colon, and Rectum. The *Cæcum* is about three inches in length. Between the large and the small intestine is a valve, which prevents the return of excrementitious matter that has passed into the large intestine. There is attached to the cæcum an appendage about the size of a goose-quill, and three inches in length, termed the *appendix vermiformis*. The *Colon* is that part of the large intestine which extends from the cæcum to the rectum, and which is divided into three parts, distinguished as the ascending, the transverse, and the descending. The *Rectum* is the terminus of the large intestine. The intestines are abundantly supplied with blood-vessels. The arteries of the small intestine are

conversion of the chyme into chyle. The *Jejunum*, so named because it is usually found empty after death, is a continuation of the duodenum, and is that portion of the alimentary canal in which the absorption of nutritive matter is chiefly effected. The *Ileum*, which signifies something rolled up, is the longest division of the small intestine. Although somewhat thinner in texture than the jejunum, yet the difference is scarcely perceptible.

Fig. 31.

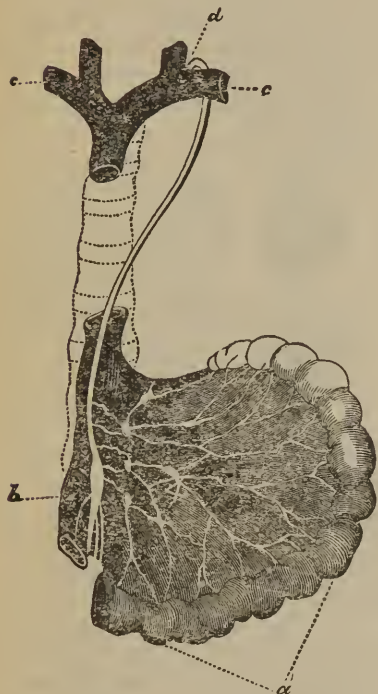


A section of the Ileum, turned inside out so as to show the appearance and arrangement of the villi on an extended surface.

from fifteen to twenty in number. The large intestine is furnished with three arteries, called the *colic arteries*. The *ileo-colic artery* sends branches to the lower part of the ileum, the head of the colon, and the appendix vermiformis. The *right colic artery* forms arches, from which branches are distributed to the ascending colon. The *colica media* separates into two branches, one of which is sent to the right portion of the transverse colon, the other to the left. In its course, the *superior hemorrhoidal artery* divides into two branches, which enter the intestine from behind, and embrace it on all sides, almost to the anus.

The *Thoracic Duct* is the principal trunk of the absorbent system, and the canal through which much of the chyle and lymph is conveyed to the blood. It begins by a convergence and union of the lymphatics on the lumbar vertebræ, in front of the spinal column, then passes upward through the diaphragm to the lower part of the neck, thence curves forward and downward, opening into the subclavian vein near its junction with the left jugular vein, which leads to the heart.

Fig. 32.



c, c. Right and left subclavian veins.  
b. Inferior vena cava. a. Intestines.  
d. Entrance of the thoracic duct into the left subclavian vein. 4. Mesenteric glands, through which the lacteals pass to the thoracic duct.

The *Liver*, which is the largest gland in the body, weighs about four pounds in the adult, and is located chiefly on the right side, immediately below the diaphragm. It is a single organ, of a dark red color, its upper surface being convex, while the lower is concave. It has two large lobes, the right

have a tendency to approach one another, and when their flattened surfaces come in contact, so firmly do they adhere that they change their shape rather than submit to a separation. If separated, however, they return to their usual form. The colorless corpuscles are larger than the red and differ from them in being extremely irregular in their shape, and in their tendency to adhere to a smooth surface, while the red corpuscles float about and tumble over one another. They are chiefly remarkable for their continual variation in form. The shape of the red corpuscles is only altered by external influ-

*Fig. 39.*



Development of human lymph and chyle-corpuscles into red corpuscles of blood. *A.* A lymph, or white blood-corpuscle. *B.* The same in process of conversion into a red corpuscle. *C.* A lymph-corpuscle with the cell-wall raised up around it by the action of water. *D.* A lymph-corpuscle, from which the granules have almost disappeared. *E.* A lymph-corpuscle, acquiring color; a single granule, like a nucleus, remains. *F.* A red corpuscle fully developed.

ences, but the white are constantly undergoing alterations, the result of changes taking place within their own substance. When diluted with water and placed under the microscope they are found to consist of a spheroidal sac, containing a clear or granular fluid and a spheroidal vesicle, which is termed the *nucleus*. They have been regarded by some physiologists as

identical with those of the lymph and chyle. Dr. Carpenter believes that the function of these cells is to convert albumen into fibrin, by the simple process of cell-growth. It is generally believed that the red corpuscles are derived in some way from the colorless. It is supposed that the red corpuscle is merely the nucleus of a colorless corpuscle enlarged, flattened, colored and liberated by the bursting of the wall of its cell. When blood is taken from an artery and allowed to remain at rest, it separates into two parts: a solid mass, called the *clot*, largely composed of fibrin; and a fluid known as the *serum*, in which the clot is suspended. This process is termed *coagulation*. The serum, mostly composed of *albumen*, is a

on the left side, in contact with the diaphragm and stomach. It is of a dark red color, slightly tinged with blue at its

Fig. 34.



Digestive Organs.

3. The tongue. 7. Parotid gland. 8. Sublingual gland. 5. Esophagus. 9. Stomach. 10. Liver. 11. Gall-bladder. 14. Pancreas. 13, 13. The duodenum. The small and large intestines are represented below the stomach

edges. Some physiologists affirm that no organ receives a greater quantity of blood, according to its size, than the spleen. The structure of the spleen and that of the mesenteric glands are similar, although the former is provided with a scanty supply of lymphatic vessels, and the chyle does not pass through it, as through the mesenteric glands. The *Pancreas* lies behind the stomach, and extends transversely across the spinal column to the right of the spleen. It is of a pale, pinkish color, and its secretion is analogous to that of the salivary glands; hence it has been called the *Abdominal Salivary Gland*.

Digestion is effected in those cavities which we have described as parts of the alimentary canal. The food is first received into the mouth, where it is masticated by the teeth,

and, after being mixed with mucus and saliva, is reduced to a mere pulp; it is then collected by the tongue, which, aided by

the voluntary muscles of the throat, carries the food backward into the pharynx, and, by the action of the involuntary muscles of the pharynx and esophagus, is conveyed to the stomach. Here the food is subjected to a peculiar, churning movement, by the alternate relaxation and contraction of the fibers which compose the muscular wall of the stomach. As soon as the food comes in contact with the stomach, its pinkish color changes to a bright red; and from the numerous tubes upon its inner surface is discharged a colorless fluid, called the *gastric juice*, which mingles with the food and dissolves it. When the food is reduced to a liquid condition, it accumulates in the pyloric portion of the stomach. Some distinguished physiologists believe that the food is kept in a gentle, unceasing, but peculiar motion, called *peristaltic*, since the stomach contracts in successive circles. In the stomach the food is arranged in a methodical manner. The undigested portion is detained in the upper, or cardiac extremity, near the entrance of the esophagus, by contraction of the circular fibers of the muscular coat. Here it is gradually dissolved, and then carried into the pyloric portion of the stomach. From this, then, it appears, that the dissolved and undissolved portions of food occupy different parts of the stomach. After the food has been dissolved by the gastric fluid, it is converted into a homogeneous, semi-fluid mass, called *chyme*. This substance passes from the stomach through the pyloric orifice into the duodenum, in which, by mixing with the bile and pancreatic fluid, its chemical properties are again modified, and it is then termed *chyle*, which has been found to be composed of three distinct parts, a reddish-brown sediment at the bottom, a whey-colored fluid in the middle, and a creamy film at the top. Chyle is different from chyme in two respects: First, the alkali of the digestive fluids, poured into the duodenum, or upper part of the small intestine, neutralizes the acid of the chyme; secondly, both the bile and the pancreatic fluid seem to exert an influence over the fatty substances contained in the chyme, which assists the subdivision of these fats into minute particles. While the chyle is propelled along the small intestine by the peristaltic action, the matter which it contains in solution is absorbed in the usual manner into the vessels of the villi by the process called *osmosis*. The fatty matters being subdivided into very minute particles, but not dissolved, and consequently incapable of being thus absorbed by osmosis, pass bodily through the epithelial lining of the intestine into the commencement of the lacteal tubes in the villi. The digested

Substances, as they are thrust along the small intestines, gradually lose their albuminoid, fatty, and soluble starchy and saccharine matters, and pass through the ileo-cæcal valve into the cæcum and large intestine. An acid reaction takes place here, and they acquire the usual fæcal smell and color, which increases as they approach the rectum. Some physiologists have supposed that a second digestion takes place in the upper portion of the large intestine. The lacteals, filled with chyle, pass into the mesenteric glands with which they freely unite, and afterward enter the *receptaculum chyli*, which is the commencement of the thoracic duct, a tube of the size of a goose-quill, which lies in front of the backbone. The lymphatics, the function of which is to secrete and elaborate lymph, also terminate in the *receptaculum chyli*, or receptacle for the chyle. From this reservoir the chyle and lymph flow into the thoracic duct, through which they are conveyed to the left subclavian vein, there to be mingled with venous blood. The blood, chyle, and lymph, are then transmitted directly to the lungs.

The process of nutrition aids in the development and growth of the body; hence it has been aptly designated a "perpetual reproduction." It is the process by which every part of the body assimilates portions of the blood distributed to it. In return, the tissues yield a portion of the material which was once a component part of their organization. The body is constantly undergoing waste as well as repair. One of the most interesting facts in regard to the process of nutrition in animals and plants is, that all tissues originate in cells. In the higher types of animals, the blood is the source from which the cells derive their constituents. Although the alimentary canal is more or less complicated in different classes of animals, yet there is no species, however low in the scale of organization, which does not possess it in some form.\* The little polyp has only one digestive cavity, which is a pouch in the interior of the body. In some animals circulation is not distinct from digestion, in others respiration and digestion are performed by the same organs; but as we rise in the scale of animal life, digestion and circulation are accomplished in separate cavities, and the functions or nutrition become more complex and distinct.

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\*The males of *Cryptophialus* and *Alcippe*, species of marine animals, are apparent exceptions to this rule. They are parasitic, possess neither mouth, stomach, thorax, nor abdomen, and are, necessarily, short-lived.

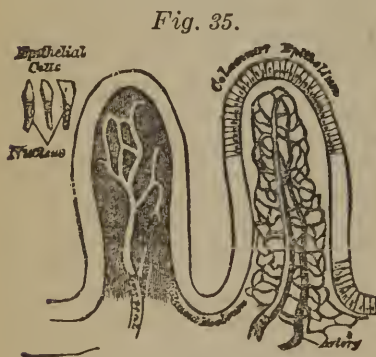
## CHAPTER XVI

# PHYSIOLOGICAL ANATOMY.

### ABSORPTION.

*Absorption* is the vital function by which nutritive materials are selected and imbibed for the sustenance of the body. Absorption, like all other functional processes, employs agents to effect its purposes, and the *villi* of the small intestine, with

their numberless projecting organs, are specially employed to imbibe fluid substances; this they do with a celerity commensurate to the importance and extent of their duties. They are little vascular prominences of the mucous membrane, arising from the interior surface of the small intestine. Each villus has two sets of vessels. (1.) The blood-vessels, which, by their frequent blending, form a complete net-work



Villi of the small intestine greatly magnified.

beneath the external epithelium; they unite at the base of the villus, forming a minute vein, which is one of the sources of the portal vein. (2.) In the center of the villus is another vessel, with thinner and more transparent walls, which is the commencement of a lacteal.

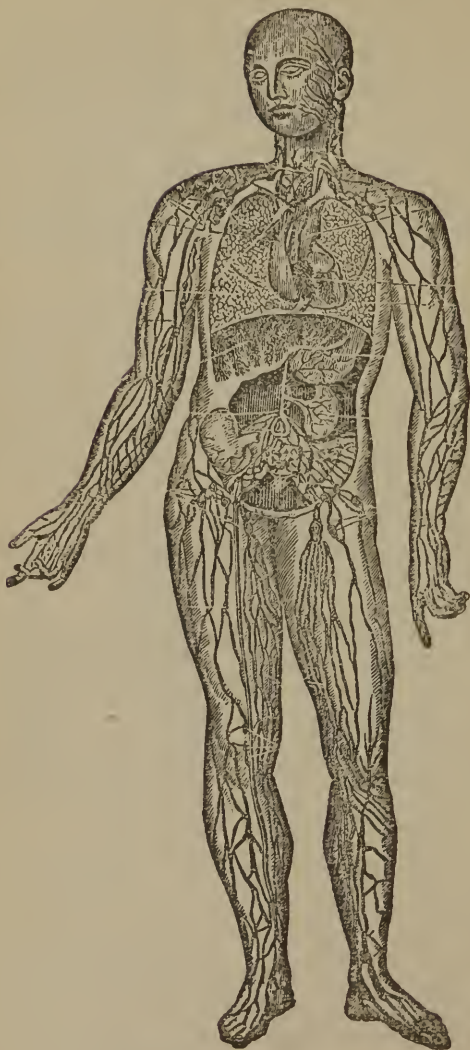
The *Lacteals* originate in the walls of the alimentary canal,

are very numerous in the small intestine, and, passing between the laminae of the mesentery, they terminate in the *receptaculum chyli*, or reservoir for the chyle. The mesentery consists of a double layer of cellular and adipose tissue. It incloses the blood-vessels, lacteals, and nerves of the small intestine, together with its accessory glands. It is joined to the posterior abdominal wall by a narrow *root*; anteriorly, it is attached to the whole length of the small intestine. The lacteals are known as the absorbents of the intestinal walls, and after digestion is accomplished, are found to contain a white, milky fluid, called *chyle*. The chyle does not represent the entire product of digestion, but only the fatty substances suspended in a serous fluid.

Formerly, it was supposed that the lacteals were the only agents employed in absorption, but more recent investigations have shown that the blood-vessels participate equally in the process, and are frequently the more active and important of the two. Experiments upon living animals have proved that absorption of poisonous substances occurs, even when all communication by way of the lacteals and lymphatics is obstructed, the passage by the blood-vessels alone remaining. The absorbent power which the blood-vessels of the alimentary canal possess, is not limited to alimentary substances, but through them, soluble matters of almost every description are received into the circulation.

The *Lymphatics* are not less important organs in the process of absorption. Nearly every part of the body is permeated by a second series of capillaries, closely interlaced with the blood-vessels, collectively termed the *Lymphatic System*. Their origin is not known, but they appear to form a *plexus* in the tissues, from which their converging trunks arise. They are composed of minute tubes of delicate membrane, and from their net-work arrangement they successively unite and finally terminate in two main trunks, called the *great lymphatic veins*. The lymphatics, instead of commencing on the intestinal walls, as do the lacteals, are distributed through most of the vascular tissues as well as the skin. The lymphatic circulation is not unlike that of the blood; its circulatory apparatus is, however, more delicate, and its functions are not so well understood.

The *lymph* which circulates through the lymphatic vessels is an alkaline fluid composed of a plasma and corpuscles. It

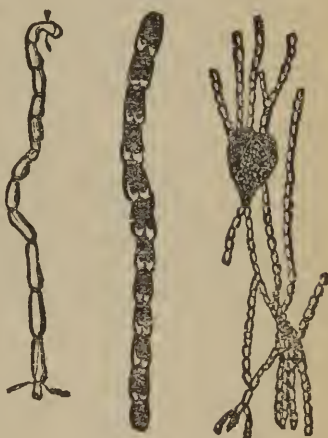
*Fig. 36.**A general view of the Lymphatic System.*

may be considered as blood deprived of its red corpuscles and diluted with water. Nothing very definite is known respecting the functions of this fluid. A large proportion of its constituents is derived from the blood, and the exact connection of these substances to nutrition is not properly understood. Some excrementitious matters are supposed to be taken from the tissues by the lymph and discharged into the blood, to be ultimately removed from the system. The lymph accordingly exerts an important function by removing a portion of the decayed tissues from the body.

In all animals which possess a lacteal system there is also a lymphatic system, the one being the complement of the other. The fact that lymph and chyle are both conveyed into the general current of circulation, leads to the inference that the lymph, as well as the chyle, aids in the process of nutrition. The body is continually undergoing change, and vital action implies waste of tissues, as well as their growth. Those organs which are the instruments of motion, as the muscles, cannot be employed without wear and waste of their component parts. Renovated tissues must replace those which are worn out, and it is a part of the function of the absorbents to convey nutritive material into the general circulation. Researches in microscopical anatomy have shown that the skin contains multitudes of lymphatic vessels and that it is a powerful absorbent.

Absorption is one of the earliest and most essential functions of animal and vegetable tissues. The simpler plants consist of only a few cells, all of which are employed in absorption; but in the flowering plants this function is performed by the roots. It is accomplished on the same general principles in animals, yet it presents more modifications and a greater number of

*Fig. 37.*



1. A representation of a lymphatic vessel highly magnified. 2. Lymphatic valves. 3. A lymphatic gland and its vessels.

organs than in vegetables. While animals receive their food into a sac, or bag called the *stomach*, and are provided with absorbent vessels such as nowhere exist in vegetables, plants plunge their absorbent organs into the earth, whence they derive nourishing substances. In the lower order of animals, as in sponges, this function is performed by contiguous cells, in a manner almost as elementary as in plants. In none of the invertebrate animals is there any *special* absorbent system. Internal absorption is classified by some authors as follows: *interstitial*, *recrementitial*, and *excrementitial*; by others as *accidental*, *venous*, and *cutaneous*. The general cutaneous and mucous surfaces exhale, as well as absorb; thus the skin, by means of its sudoriferous glands, exhales moisture, and is at the same time as before stated, a powerful absorbent. The mucous surface of the lungs is continually throwing off carbonic acid and absorbing oxygen; and through their surface poisons are sometimes taken into the blood. The continual wear and waste to which living tissues are subject, makes necessary the provision of such a system of vessels for conveying away the worn-out materials and supplying the body with new.

## CHAPTER XVII

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# PHYSICAL AND VITAL PROPERTIES OF THE BLOOD.

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*Blood* is the animal fluid by which the tissues of the body are nourished. This pre-eminently vital fluid permeates every organ, distributes nutritive material to every texture, is essentially modified by respiration, and, finally, is the source of every secretion and excretion. Blood has four constituents: Fibrin, Albumen, Salts (which elements, in solution, form the *liquor sanguinis*), and the Corpuscles. Microscopical examination shows that the corpuscles are of two kinds, known as the *red* and the *white*; the former are by far the more abundant, there being six hundred and sixty-six red cells to one of white to

Fig. 38.



Red corpuscles of human blood, represented as *a*, as they are seen when rather *beyond* the focus of the microscope; and at *b*, as they appear when *within* the focus. Magnified 400 diameters.

the cubic millimeter of blood. They are circular in form and have a smooth exterior, and are on an average  $\frac{1}{3200}$  part of an inch in diameter, and are about one-fourth of that in thickness. Hence more than ten millions of them may lie on a space an inch square. If spread out in thin layers and subjected to transmitted light, they present a slightly yellowish color, but when crowded together and viewed by refracted light, exhibit a deep red color.

These blood-corpuscles have been termed *discs*, and are not, as some have supposed, solid material, but are very nearly fluid. The red corpuscles although subjected to continual movement,

being nearly four times as large as the left. The liver has two coats, the *serous*, which is a complete investment, with the exception of the diaphragmatic border, and the depression for the gall-bladder, and which helps to suspend and retain the organ in position; and the *fibrous*, which is the inner coat of the liver, and forms sheaths for the blood-vessels and excretory ducts. The liver is abundantly supplied with arteries, veins, nerves, and lymphatics. Unlike the other glands of the human body, it receives two kinds of blood; the arterial for its nourishment, and the venous, from which it secretes the bile. In the lower surface of the liver is lodged the gall-bladder, a membranous sac, or reservoir, for the bile. This fluid is not absolutely necessary to the digestion of food, since this process is effected by

Fig. 33.



The inferior surface of the liver.

1. Right lobe. 2. Left lobe. 3. Gall-bladder.

other secretions, nor does bile exert any special action upon starchy or oleaginous substances, when mixed with them at a temperature of 100° F. Experiments also show that in some animals there is a constant flow of bile, even when no food has been taken, and there is consequently no digestion to be performed. Since the bile is formed from the venous blood, and taken from the waste and disintegration of animal tissue, it would appear that it is chiefly an excrementitious fluid. It does not seem to have accomplished its function when discharged from the liver and poured into the intestine, for there it undergoes various alterations previous to re-absorption, produced by its contact with the intestinal juices. Thus the bile, after being transformed in the intestines, re-enters the blood under a new form, and is carried to some other part of the system to perform its mission.

The *Spleen* is oval, smooth, convex on its external, and irregularly concave on its internal, surface. It is situated

transparent, straw-colored fluid, having the odor and taste of blood. The whole quantity of blood in the body is estimated on an average to be about one-ninth of its entire weight. The distinctions between the arterial and venous blood are marked, since in the arterial system the blood is uniformly bright red, and in the venous of a very dark red color. The blood-corpuscles contain both oxygen and carbonic acid in solution. When carbonic acid predominates, the blood is dark red; when oxygen, scarlet. In the lungs, the corpuscles give up carbonic acid, and absorb a fresh supply of oxygen, while in the general circulation the oxygen disappears in the process of tissue transformation, and is replaced, in the venous blood, by carbonic acid. The nutritive portions of food are converted into a homogeneous fluid, which pervades every part of the body, is the basis of every tissue, and which is termed the *blood*. This varies in color and composition in different animals. In the polyp the nutritive fluid is known as *chyme*, in many mollusks, as well as articulates, it is called *chyle*, but in vertebrates, it is more highly organized and is called blood. In all the higher animal types it is of a red color, although redness is not one of its essential qualities. Some tribes of animals possess true blood, which is not red; thus the blood of the insect is colorless and transparent; that of the reptile yellowish; in the fish the principal part is without color, but the blood of the bird is deep red. The blood of the mammalia is of a bright scarlet hue. The temperature of the blood varies in different species, as well as in animals of the same species under different physiological conditions; for this reason, some animals are called *cold-blooded*. Disease also modifies the temperature of the blood; thus in fevers it is generally increased, but in cholera greatly diminished. The blood has been aptly termed the "vital fluid," since there is a constant flow from the heart to the tissues and organs of the body, and a continual return after it has circulated through these parts. Its presence in every part of the body is one of the essential conditions of animal life, and is effected by a special set of organs, called the *circulatory organs*.

## CHAPTER XVIII

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# PHYSIOLOGICAL ANATOMY.

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### CIRCULATORY ORGANS.

Having considered the formation of chyle, traced it through the digestive process, seen its transmission into the *vena cava*, and, finally, its conversion into blood, we shall now describe how it is distributed to every part of the system. This is accomplished through organs which, from the round of duties they perform, are called *circulatory*. These are the Heart, Arteries, Veins, and Capillaries, which constitute the *vascular system*.

Within the thorax or chest of the human body, and enclosed within a membranous sac, called the *pericardium*, is the great force-pump of the system, the heart. This organ, to which all the arteries and veins of the body may be either directly or indirectly traced, is roughly estimated to be equal in size to the closed fist of the individual to whom it belongs.

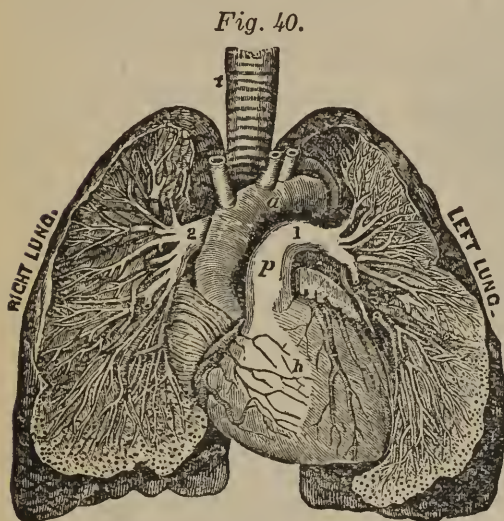
It has a broad end turned upwards, and a little to the right side, termed its *base*; and a pointed end called its *apex*, turned downwards, forwards, and to the left side, and lying between a point about an inch to the right of, and below, the left nipple, or just below the fifth rib. Attached to the rest of the body only by the great blood-vessels which issue from and enter it at its base, the heart is the most mobile organ in the human economy, being free to move in different directions.

The heart is divided into two great cavities by a fixed partition, which extends from the base to the apex of the organ, and which prevents any direct communication between them. Each of these great cavities is further subdivided transversely

by a movable partition, the cavity above each transverse partition being called the *auricle*, and the cavity below, the *ventricle*, right or left, as the case may be.

The walls of the auricles are much thinner than those of the ventricles, and the wall of the right ventricle is much thinner than that of the left, from the fact that the ventricles have more work to perform than the auricles, and the left ventricle more than the right.

In structure, the heart is composed almost entirely of muscular fibers, which are arranged in a very complex and wonderful manner. The outer surface of the heart is covered with the pericardium, which closely adheres to the muscular substance.



General view of the Heart and Lungs.

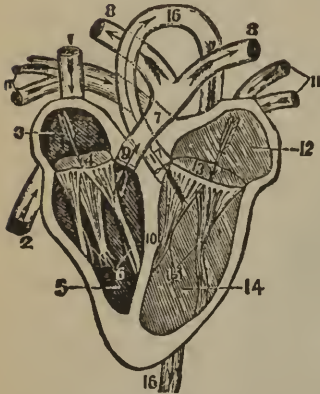
t. Trachea, or wind-pipe. a. Aorta. p. Pulmonary artery. 1, 2. Branches of the pulmonary artery, one going to the right, the other to the left lung. h. The heart.

Inside, the cavities are lined with a thin membrane, called the *endocardium*. At the junction between the auricles and ventricles, the apertures of communication between their cavities are strengthened by *fibrous rings*. Attached to these fibrous rings are the movable partitions or valves, between the auricles and the ventricles, the one on the right side of the heart being called the *tricuspid valve*, and the one on the left side the *mitral valve*. A number of fine, but strong, tendinous chords, called *chordæ tendineæ*, connect the edges and apices of these valves with column-like elevations of the fleshy substance of the walls of the ventricles, called *columnæ carneæ*.

The valves are so arranged that they present no obstacle

to the free flow of blood from the auricles into the ventricles, but if any is forced the other way, it gets between the valve and the wall of the heart, and drives the valve backwards and upwards, thus forming a transverse partition between the auricle and ventricle, through which no fluid can pass.

Fig. 41.



1. The descending vena cava.
2. The ascending vena cava. 3. The right auricle. 4. The opening between the right auricle and the right ventricle. 5. The right ventricle. 6. The tricuspid valves. 7. The pulmonary artery. 8, 8. The branches of the pulmonary artery which pass to the right and the left lung. 9. The semilunar valves of the pulmonary artery. 10. The septum between the two ventricles of the heart. 11, 11. The pulmonary veins. 12. The left auricle. 13. The opening between the left auricle and ventricle. 14. The left ventricle. 15. The mitral valves. 16, 16. The aorta. 17. The semilunar valves of the aorta.

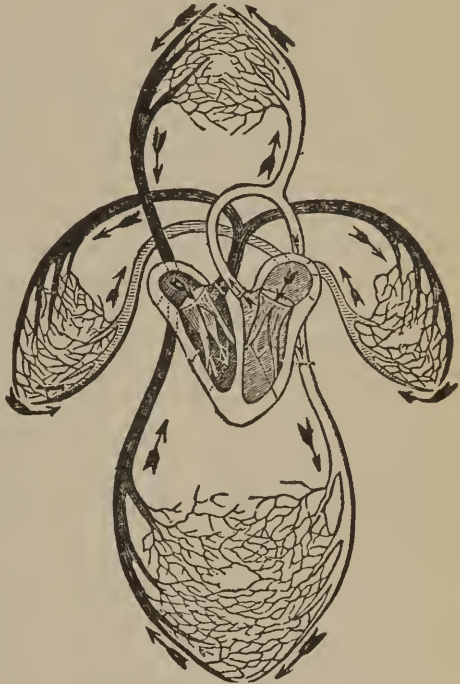
At the base of the heart are given off two large arteries, one on the right side, which conveys the blood to the lungs, called the *pulmonary artery*, and one on the left side, which conveys the blood to the system in general, called the *aorta*. At the junction of each of these great vessels with its corresponding ventricle, is another valvular apparatus, consisting of three pouch-like valves, called the *semilunar valves*, from their resemblance, in shape, to a half-moon. Being placed on a level and meeting in the middle line, they entirely prevent the passage of any fluid which may be forced along the artery towards the heart, but, flapping back, they offer no obstruction to the free flow of blood from the ventricles into the arteries.

The *Arteries*, being always found empty after death, were supposed by the ancients, who were ignorant of the circulation of the blood, to be tubes containing air; hence their name, which is derived from a Greek word and signifies an *air-tube*. Arteries are the cylindrical tubes which carry blood to every part of the system. All the arteries, except the coronary which supply the substance of the heart, arise from the two main trunks, the pulmonary artery and the aorta. They are

of a yellowish-white color, and their inner surface is smooth. The arteries have three coats. (1.) The external coat, which is destitute of fat, and composed chiefly of cellular tissue, is very firm and elastic, and can readily be dissected from the middle coat. (2.) The middle, or fibrous coat, is thicker than the external, and composed of yellowish fibers, its chief property is contractility. (3.) The internal coat consists of a colorless, thin, transparent membrane, yet so strong that it can, it is thought, better resist a powerful pressure than either of the others. Arteries are very elastic as well as extensible, and their chief extensibility is in length. If an artery of a dead body be divided, although empty, its cylindrical form will be preserved.

The *Veins* are the vessels through which the venous blood returns to the auricles of the heart. They are more numerous than the arteries, and originate from numerous capillary tubes, while the arteries are given off from main trunks. In some parts of the body, the veins correspond in number to the arteries; while in others, there are two veins to every artery. The veins commence by minute roots in the capillaries, which are everywhere distributed through the body, and gradually increase in size, until they unite and become large trunks,

Fig. 42.



A representation of venous and arterial circulation of the blood.

conveying the dark blood to the heart. The veins, like the arteries, have three coats. The external, or cellular coat, resembles that of the arteries; the middle is fibrous, but thinner than the corresponding one of the arteries; and the internal coat is serous, and analogous to that of those vessels. The veins belong to the three following classes: (1.) The systemic veins, which bring the blood from different parts of the body and discharge it into the vena cava, by means of which it is conveyed to the heart; (2), the pulmonary veins, which bring the arterial, or bright red blood from the lungs and carry it to the left auricle; (3), the veins of the portal system, which originate in the capillaries of the abdominal organs, then converge into trunks and enter the liver, to branch off again into divisions and subdivisions of the minutest character.

The *Capillaries* form an extremely fine net-work, and are distributed to every part of the body. They vary in diameter from  $\frac{1}{3500}$  to  $\frac{1}{2000}$  part of inch. They are so universally prevalent throughout the skin, that the puncture of a needle would wound a large number of them. These vessels receive the blood and bring it into intimate contact with the tissues, which take from it the principal part of its oxygen and other elements, and give up to it carbonic acid and the other waste products resulting from the transformation of the tissues, which are transmitted through the veins to the heart, and thence by the arteries to the lungs and various excretory organs.

The blood from the system in general, except the lungs, is poured into the right auricle by two large veins, called the superior and the inferior *vena cava*; and that returning from the lungs is poured into the left auricle by the *pulmonary veins*.

During life the heart contracts rhythmically, the contractions commencing at the base, in each auricle, and extending towards the apex.

Now it follows, from the anatomical arrangement of this organ, that when the auricles contract, the blood contained in them is forced through the auriculo-ventricular openings into the ventricles; the contractions then extending to the ventricles,

in a wave-like manner, the great proportion of the blood, being prevented from re-entering the auricles by the tricuspid and mitral valves, is forced onward into the pulmonary artery from the right ventricle, and into the aorta from the left ventricle.

When the contents of the ventricles are suddenly forced into these great blood-vessels, a shock is given to the entire mass of fluid which they contain, and this shock is speedily propagated along their branches, being known at the wrist as the *pulse*.

On inspection, between the fifth and sixth ribs on the left side of the chest, a movement is perceptible, and, if the hand be applied, the impulse may be felt. This is known as the throbbing, or beating of the heart.

If the ear is placed over the region of the heart, certain sounds are heard, which recur with great regularity. First is heard a comparatively long, dull sound, then a short, sharp sound, then a pause, and then the long, dull sound again. The first sound is caused mainly by the tricuspid and mitral valves, and the second is the result of sudden closure of the semilunar valves.

No language can adequately describe the beauty of the circulatory system. The constant vital flow through the larger vessels, and the incessant activity of those so minute that they are almost imperceptible, fully illustrate the perfectness of the mechanism of the human body, and the wisdom and goodness of Him who is its author.

Experiments have shown that the small arteries may be directly influenced through the nervous system, which regulates their caliber by controlling the state of contraction of their muscular walls. The effect of this influence of the nervous system enables it to control the circulation over certain areas; and, notwithstanding the force of the heart and the state of the blood-vessels in general, to materially modify the circulation in different spots. Blushing, which is simply a local modification of the circulation, is effected in this way. Some emotion takes possession of the mind, and the action of the nerves, which ordinarily keeps up a moderate contraction of the muscular coats of the arteries, is lost, and the vessels relax and become distended with arterial blood, which is a warm and bright red fluid; thereupon a burning sensation is felt, and the skin grows red, the degree of the blush depending upon the intensity of the emotion.

The pallor produced by fright and by extreme anxiety, is purely the result of a local modification of the circulation, brought about by an over-stimulation of the nerves which supply the small arteries, causing them to contract, and to thus cut off more or less completely the supply of blood.

## CHAPTER XIX

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# PHYSIOLOGICAL ANATOMY.

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### THE ORGANS OF RESPIRATION.

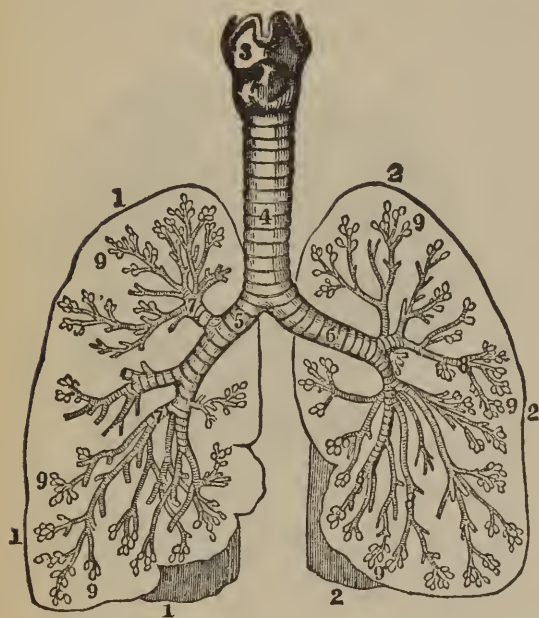
**The Organs of Respiration** are the *Trachea*, or windpipe, the *Bronchia*, formed by the subdivision of the trachea, and the *Lungs*, with their air-cells. The *Trachea* is a vertical tube situated between the lungs below, and a short quadrangular cavity above, called the *larynx*, which is part of the windpipe, and used for the purpose of modulating the voice in speaking or singing. In the adult, the trachea, in its unextended state, is from four and one-half to five inches in length, about one inch in diameter, and, like the larynx, is more fully developed in the male than in the female. It is a fibro-cartilaginous structure, and is composed of flattened rings, or segments of circles. It permits the free passage of air to and from the lungs.

The *Bronchia* are two tubes, or branches, one proceeding from the windpipe to each lung. Upon entering the lungs, they divide and subdivide until, finally, they terminate in small cells, called the *bronchial or air-cells*, which are of a membranous character.

The *Lungs* are irregular conical organs rounded at the apex, situated within the chest, and filling the greater part of it, since the heart is the only other organ which occupies much space in the thoracic cavity. The lungs are convex externally, and conform to the cavity of the chest, while the internal surface is concave for the accommodation of the heart. The size of the lungs depends upon the capacity of the chest. Their

color varies, being of a pinkish hue in childhood, but of a gray, mottled appearance in the adult. They are termed the *right* and *left* lung. Each lung resembles a cone with its base resting upon the diaphragm, and its apex behind the collar-bone. The right lung is larger though shorter, than the left,

Fig. 43.



An ideal representation of the Respiratory Organs.

3. The larynx. 4. The trachea. 5, 6. The bronchia.

9, 9, 9, 9. Air-cells. 1, 1, 1, 2, 2, 2. Outlines of the lungs.

not extending so low, and has three *lobes*, formed by deep fissures, or longitudinal divisions, while the left has but two lobes. Each lobe is also made up of numerous *lobules*, or small lobes, connected by cellular tissue, and these contain great numbers of cells. The lungs are abundantly supplied with blood-vessels, lymphatics, and nerves. The density of a lung depends upon the

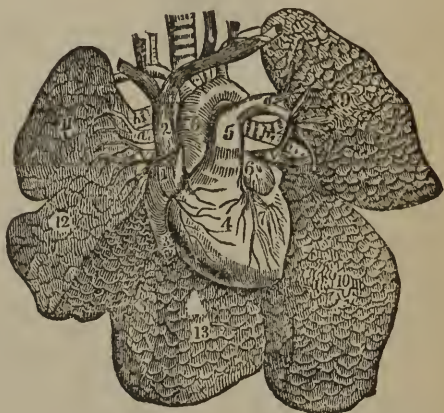
amount of air which it contains. Thus, experiment has shown that in a *fœtus* which has never breathed, the lungs are compact and will sink in water; but as soon as they become inflated with air, they spread over a larger surface, and are therefore more buoyant. Each lung is invested, as far as its root, with a membrane, called the *pleura*, which is then continuously extended to the cavity of the chest, thus performing the double office of lining it, and constituting a partition

between the lungs. The part of the membrane which forms this partition is termed the *mediastinum*. Inflammation of this membrane is called *pleurisy*. The lungs are held in position by the root, which is formed by the pulmonary arteries, veins, nerves, and the bronchial tubes. Respiration is the function by which the venous blood, conveyed to the lungs by the pulmonary artery, is converted into arterial blood. This is effected by the elimination of carbonic acid, which is expired or exhaled from the lungs, and by the absorption of oxygen from the air which is taken into the lungs, by the act of inspiration or inhalation. The act of expiration is performed chiefly by the elevation of the diaphragm and the descent of the ribs, and inspiration is principally effected by the descent of the diaphragm and the elevation of the ribs.

When the muscles of some portions of the air-passages are relaxed, a peculiar vibration follows, known as snoring. Coughing and sneezing are sudden and spasmodic expiratory efforts, and generally involuntary. Sighing is a prolonged deep inspiration, followed by a rapid, and generally audible expiration. It is remarkable that laughing and sobbing, although indicating opposite states of the mind, are produced in very nearly the same manner. In hiccough, the contraction is more sudden and spasmodic than in laughing or sobbing. The quantity of oxygen consumed during sleep is estimated to be considerably less than that consumed during wakefulness.

It is difficult to estimate the amount of air taken into the

Fig. 44.

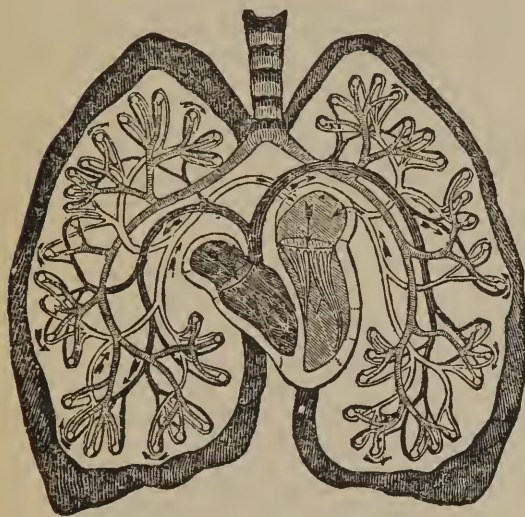


A Representation of the Heart and Lungs.

- 4. The heart. 5. The pulmonary artery.
- 8. Aorta. 9, 11. Upper lobes of the lungs.
- 10, 13. Lower lobes. 12. Middle lobe of the right lung.
- 2. Superior vena cava. 3. Inferior vena cava.

lungs at each inspiration, as the quantity varies according to the condition, size, and expansibility of the chest, but in ordinary breathing it is supposed to be from twenty to thirty cubic inches. The consumption of oxygen is greater when the temperature is low, and during digestion. All the respiratory movements, so far as they are independent of the will of the individual, are controlled by that part of the brain called the *medulla oblongata*. The respiratory, or breathing process, is not instituted for the benefit of man alone, for

Fig. 45.



View of the Pulmonary Circulation.

we find it both in the lower order of animals and in plant life. Nature is very economical in the arrangement of her plans, since the carbonic acid, which is useless to man, is indispensable to the existence of plants, and the oxygen, rejected by them, is appropriated to his use. In the lower order of animals, the

respiratory act is similar to that of the higher types, though not so complex; for there are no organs of respiration, as the lungs and gills are called. Thus, the higher the animal type, the more complex its organism. The effect of air upon the color of the blood is very noticeable. If a quantity be drawn from the body, thus being brought into contact with the air, its color gradually changes to a brighter hue. There is a marked difference between the properties of the venous and the arterial blood.

The venous blood is carried, as we have previously

described, to the right side of the heart and to the lungs, where it is converted into arterial blood. It is now of uniform quality, ready to be distributed throughout the body, and capable of sustaining life and nourishing the tissues. Man breathes by means of lungs; but who can understand their wonderful mechanism, so perfect in all its parts? Though every organ is subservient to another, yet each has its own office to perform. The minute air-cells are for the aeration of the blood; the larger bronchial tubes ramify the lungs, and suffuse them with air; the trachea serves as a passage for the air to and from the lungs, while at its upper extremity is the larynx, which has been fitly called the organ of the human voice. At its extremity we find a sort of shield, called the *epiglottis*, the office of which is supposed to be to prevent the intrusion of foreign bodies.

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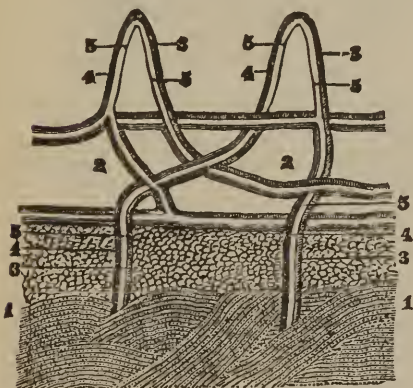
## CHAPTER XX

# PHYSIOLOGICAL ANATOMY.

### THE SKIN.

Through digestion and respiration, the blood is continually supplied with material for its renewal; and, while the nutritive constituents of the food are retained to promote the

*Fig 46.*



An Ideal View of the Papillæ.

- 1, 1. Cutis vera.    2, 2. Papillary layer.  
3, 3. Arteries of the papillæ.    4, 4. Nerves of  
the papillæ.    5, 5. Veins of the papillæ.

growth of the body, those which are useless or injurious are in various ways expelled. There are, perhaps, few parts of the body more actively concerned in this removal than the skin.

The skin is a membranous envelope covering the entire body. It consists of two layers, termed the *Cutis Vera*, or true skin, and the *Epidermis*, or cuticle. The *Cutis Vera* is composed of fibers similar to those of the cellular tissue. It con-

sists of white and yellow fibers, which are more densely woven near the surface than deeper in the structure; the white

give strength, the yellow strength and elasticity combined. The true skin may be divided into two layers, differing in their characteristics, and termed respectively the superficial or papillary layer, and the deep or fibrous layer. Upon the external surface, are little conical prominences, known as *papillæ*. The papillæ are irregularly distributed over the body, in some parts being smaller and more numerous than in others, as on the finger-ends, where their summits are so intimately connected as to form a tolerably smooth surface. It is owing to their perfect development,

that the finger-tips are adapted to receive the most delicate impressions of touch. Although every part of the skin is sensitive, yet the papillæ are extremely so, for they are the principal means through which the impressions of objects are communicated. Each papillæ not only contains a minute vein and artery, but it also incloses a loop of sensitive nerves. When the body is exposed to cold, these

papillæ can be more distinctly seen in the form of prominences, commonly known as "goose-pimples."

The internal, or fibrous layer of the skin, contains numerous depressions, each of which furnishes a receptacle for fat. While the skin is supplied with a complete net-work of arteries, veins, and nerves, which make it sensitive to the slightest touch, it also contains numerous lymphatic vessels, so minute that they are invisible to the naked eye.

Among the agents adapted for expelling the excretions from the system, few surpass the *Sudoriferous Glands*. These are minute organs which wind in and out over the whole extent of the true skin, and secrete the perspiration. Though much of it passes off as insensible transpiration, yet it often

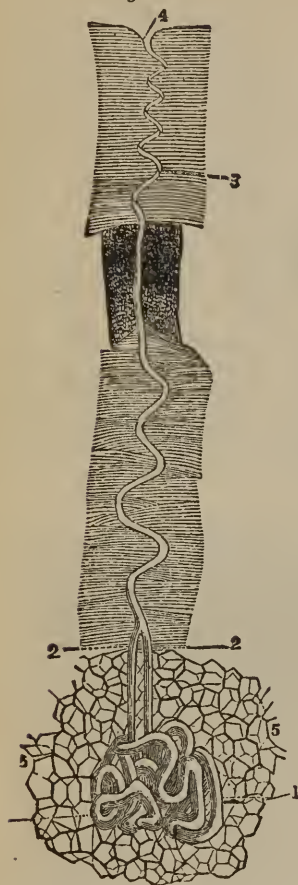
Fig. 47.



A section of the skin, showing its arteries and veins. A, A. Arterial branches. B, B. Capillaries in which the branches terminate. C. The venous trunk into which the blood from the capillaries flows.

accumulates in drops of sweat, during long-continued exercise or exposure to a high temperature. The office of the perspiration is two-fold. It removes noxious matter from the system, and diminishes animal heat, and thereby equalizes the temperature of the body. It also renders the skin soft and pliable, thus better adapting it to the movements of the muscles. The *Sebaceous Glands*, which are placed in the true skin, are less abundant where the sudoriferous glands are most numerous, and *vice versa*. Here, as elsewhere, nature acts with systematic and intelligent design. The perspiratory glands are distributed where they are most needed,—in the eyelids, serving as lubricators; in the ear passages, to produce the *cerumen*, or wax, which prevents the intrusion of small insects; and in the scalp, to supply the hair with its natural pomatum.

Fig. 48.



A perspiratory gland, highly magnified. 1, 1. The gland. 2, 2. Excretory ducts uniting to form a tube which tortuously perforates the cuticle at 3, and opens obliquely on its surface at 4.

horny scales. As soon as dry, they are removed in the form of scurf, and replaced by new ones from the cutis vera.

The *Epidermis*, or *Cuticle*, so called because it is placed upon the skin, is the outer layer of the skin. Since it is entirely destitute of nerves and blood-vessels, it is not sensitive. Like the cutis vera, it has two surfaces composed of layers. The internal, or *Rete Mucosum*, which is made up chiefly of pigment cells, is adapted to the irregularities of the cutis vera, and sends prolongations into all its glandular follicles. The external surface, or epidermis proper, is elastic, destitute of coloring matter, and consists of mere

These scales may be removed by a wet-sheet pack, or by friction. The cuticle is constantly undergoing renewal. This

Fig. 49.

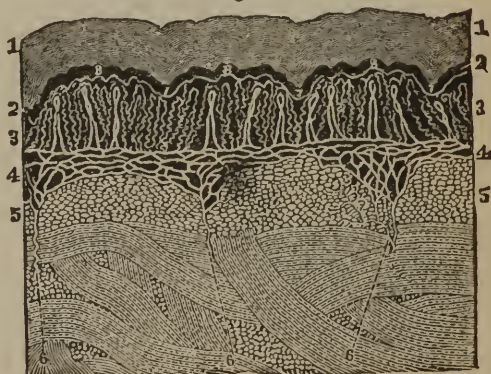


A representation of oil-tubes from the Scalp and Nose.

layer serves to cover and protect the nervous tissue of the true skin beneath. We may here observe that the cuticle contains the pigment for coloring the skin. In dark races, as the negro, the cuticle is very thick and filled with black pigment. The radiation of animal heat is dependent upon the thickness and color of this

cuticle. Thus, in the dark races, the pigment cells are most numerous, and in proportion as the skin is dark or fair do we find these cells in greater or lesser abundance. The skin of the Albino is of pearly whiteness, devoid even of the pink or brown tint which that of the European always possesses. This peculiarity must be attributed to the absence of pigment cells, which, when present, always present a more or less dark color. The theory that *climate* alone

Fig. 50.



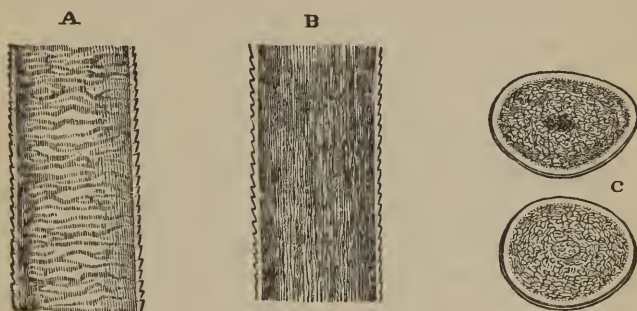
Anatomy of the Skin. 5, 5. Cutis vera (true skin). 4, 4. Nervous tissue. 3, 3. Sensitive layer in which are seen the nerves. 2, 2. The layer containing pigment cells. 1, 1. Epidermis (cuticle).

is capable of producing all these diversities is simply absurd. The Esquimaux, who live in Greenland and the arctic regions

of America, are remarkable for the darkness of their complexion. Humboldt remarks that the American tribes of the tropical regions have no darker skin than the mountaineers of the temperate zone. Climate may *modify* the complexion, but it cannot *make* it.

*Hairs* are horny appendages of the skin, and, with the exception of the hands, the soles of the feet, the backs of the

Fig. 51.



Structure of the Human Hair.

**A.** External surface of the shaft, showing the transverse striæ and jagged boundary, caused by the imbrications of the scaly cortex. **B.** Longitudinal section of the shaft, showing the fibrous character of the medullary substance, and the arrangement of the pigmentary matter. **C.** Transverse sections, showing the distinction between the cortical and medullary substances, and the central collection of pigmentary matter, sometimes found in the latter. Magnified 310 diameters.

fingers and toes, between the last joint and the nail, and the upper eyelids, are distributed more or less abundantly over every part of the surface of the body. Over the greater part of the surface the hairs are very minute, and in some places are not actually apparent above the level of the skin; but the hair of the head, when permitted to reach its full growth, attains a length of from twenty inches to a yard, and, in rare instances, even six feet. A hair may be divided into a middle portion, or *shaft*, and two extremities; a peripheral extremity, called the *point*; and a central extremity, inclosed within the hair-sac, or follicle, termed the *root*. The root is some-

what greater in diameter than the shaft, and cylindrical in form, while its lower part expands into an oval mass, called the *bulb*. The shaft of the hair is not often perfectly cylindrical, but is more or less flattened, which circumstance gives rise to waving and curling hair; and, when the flattening is spiral in direction, the curling will be very great. A hair is composed of three different layers of cell-tissues: a loose, cellulated substance, which occupies its center, and constitutes the *medulla*, or pith; the fibrous tissue, which incloses the medulla, and forms the chief bulk of the hair; and a thin layer, which envelops the fibrous structure, and forms the smooth surface of the hair. The medulla is absent in the downy hairs, but in the coarser class it is always present, especially in white hair. The color of hair is due partly to the granules and partly to an intergranular substance, which occupies the interstices of the granules and the fibers. The quantity of hair varies according to the proximity and condition of the follicles. The average number of hairs of the head may be stated at 1,000 in a superficial square inch; and, as the surface of the scalp has an area of about one hundred and twenty superficial square inches, the average number of hairs on the entire head is 120,000. The hair possesses great durability, as is evinced by its endurance of chemical processes, and by its discovery in the tombs of mummies more than two thousand years old. The hair is remarkable for its elasticity and strength. Hair is found to differ materially from horn in its chemical composition. According to Vauquelin, its constituents are animal matter, a greenish-black oil, a white, concrete oil, phosphate of lime, a trace of carbonate of lime, oxide of manganese, iron, sulphur, and silex. Red hair contains a reddish oil, a large proportion of sulphur, and a small quantity of iron. White hair contains a white oil, and phosphate of magnesia. It has been supposed that hair grows after death, but this theory was probably due to the lengthening of the hair by the absorption of moisture from the body or atmosphere.

### THE NAILS.

The *nails* constitute another class of appendages of the skin. They consist of thin plates of horny tissue, having a root, a body, and a free extremity. The root, as well as the lateral portion, is implanted in the skin, and has a thin margin which is received into a groove of the true skin. The under surface is furrowed, while the upper is comparatively smooth. The nails grow in the same manner as the cuticle.

## CHAPTER XXI

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# PHYSIOLOGICAL ANATOMY.

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### SECRETION.

The term *Secretion*, in its broadest sense, is applied to that process by which substances are separated from the blood, either for the reparation of the tissues or for excretion. In the animal kingdom this process is less complicated than in vegetables. In the former it is really a *separation* of nutritive material from the blood. The process, when effected for the removal of effete matter, is, in a measure, chemical, and accordingly the change is greater.

Three elementary constituents are observed in secretory organs: the cells, a basement membrane, and the blood-vessels. Obviously, the most *essential* part is the *cell*.

The physical condition necessary for the healthy action of the secretory organs is a copious supply of blood, in which the nutritive materials are abundant. The nervous system also influences the process of secretion to a great extent. Intense emotion will produce tears, and the sight of some favorite fruit will generally increase the flow of saliva.

The process of secretion depends upon the anatomical and chemical constitution of the cell-tissues. The principal secretions are (1), Perspiration; (2), Tears; (3), Sebaceous matter; (4), Mucus; (5), Saliva; (6), Gastric juice; (7), Intestinal juice; (8), Pancreatic juice; (9), Bile; (10), Milk.

**Perspiration** is a watery fluid secreted in minute glands, which are situated in every part of the skin, but are more numerous on the anterior surfaces of the body. Long thread-like tubes, only  $\frac{1}{400}$  of an inch in diameter, lined with

epithelium, penetrate the skin, and terminate in rounded coils, enveloped by a net-work of capillaries, which supply the secretory glands with blood. It is estimated by Krause that the entire number of perspiratory glands is two million three hundred and eighty-one thousand two hundred and forty-eight, and the length of each glandular coil being  $\frac{1}{16}$  of an inch, we may estimate the length of tubing to be not less than two miles and a third. This secretion has a specific gravity of 1003.5, and, according to Dr. Dalton, is composed of

Water, . . . . .	995.50
Chloride of Sodium, . . . . .	2.23
Chloride of Potassium, . . . . .	0.24
Sulphate of Soda and Potassa, . . . . .	0.01
Salts of Organic Acids, with Soda and Potassa, . . . . .	2.02
	<hr/>
	1000.00

Traces of organic matter, mingled with a free volatile acid, are also found in the perspiration. It is the acid which imparts to this secretion its peculiar odor, and acid reaction. The process of its secretion is continuous, but, like all bodily functions, it is subject to influences which augment or retard its activity. If, as is usually the case when the body is in a state of repose, evaporation prevents its appearance in the *liquid* form, it is called *invisible* or *insensible perspiration*. When there is unusual muscular activity, it collects upon the skin, and is known as *sensible perspiration*. This secretion performs an important office in the animal economy, by maintaining the internal temperature at about 100° Fahr. Even in the Arctic regions, where the explorer has to adapt himself to a temperature of 40° to 80° below zero, the generation of heat in the body prevents the internal temperature from falling below this standard. On the contrary, if the circulation is quickened by muscular exertion, the warmer blood flowing from the internal organs into the capillaries, raises the temperature of the skin, secretion is augmented, the moisture exudes from the pores, and perceptible evaporation begins. A large portion of the animal heat is thrown off in this process, and the temperature of the skin is reduced. A very warm, dry

atmosphere can be borne with impunity, but if moisture is introduced, evaporation ceases, and the life of the animal is endangered. Persons have been known to remain in a temperature of about 300° Fahr. for some minutes without unpleasant effects. Three conditions may be assigned as effective causes in retarding or augmenting this cutaneous secretion, variations in the temperature of the atmosphere, muscular activity, and influences which affect the nerves. The emotions exert a remarkable influence upon the action of the perspiratory glands. Intense fear causes great drops of perspiration to accumulate on the skin, while the salivary glands remain inactive.

**Tears.** The lachrymal glands are small lobular organs, situated at the outer and upper orbit of the eye, and have from six to eight ducts, which open upon the conjunctiva, between the eyelid and its inner fold. This secretion is an alkaline, watery fluid. According to Dr. Dalton, its composition is as follows:

Water, . . . . .	982.0
Albuminous matter, . . . . .	5.0
Chloride of Sodium, . . . . .	13.0
Mineral Salts, a trace, . . . . .	
	<hr/>
	1000.0

The function of this secretion is to preserve the brilliancy of the eye. The tears are spread over this organ by the reflex movement of the eyelid, called winking, and then collected in the *puncta lachrymalia* and discharged into the nasal passage. This process is constant during life. The effect of its repression is seen in the dim appearance of the eye after death. Grief or excessive laughter usually excite these glands until there is an overflow.

**Sebaceous Matter.** Three varieties of this secretion are found in the body. A product of the sebaceous glands of the skin is found in those parts of the body which are covered with hairs; also on the face and the external surface of the organs of generation. The *sebaceous glands* consist of a group of flask-shaped cavities, opening into a common excretory duct.

Their secretion serves to lubricate the hair and soften the skin. The *ceruminous glands* of the *external auditory meatus*, or outer opening of the ear, are long tubes terminating in a glandular coil, within which is secreted the glutinous matter of the ear. This secretion serves the double purpose of moistening the outer surface of the *membrana tympani*, or ear-drum, and, by its strong odor, of preventing the intrusion of insects. The *Meibomian glands* are arranged in the form of clusters along the excretory duct, which opens just behind the roots of the eyelashes. The oily nature of this secretion prevents the tears, when not stimulated by emotion, from overflowing the lachrymal canal.

**Mucus.** The mucous membranes are provided with minute glands which secrete a viscid, gelatinous matter, called *mucus*. The peculiar animal matter which it contains is termed *mucosin*. These glands are most numerous in the Pharynx, Esophagus, Trachea, Bronchia, Vagina and Urethra. They consist of a group of secreting sacs, terminating at one extremity in a closed tube, while the other opens into a common duct. The mucus varies in composition in different parts of the body; but in all, it contains a small portion of insoluble animal matter. Its functions are threefold. It lubricates the membranes, prevents their injury, and facilitates the passage of food through the alimentary canal.

**Saliva.** This term is given to the first of the digestive fluids, which is secreted in the glands of the mouth. It is a viscid, alkaline liquid, with a specific gravity of about 1005. If allowed to stand, a whitish precipitate is formed. Examinations with the microscope show it to be composed of minute, granular cells and oil globules, mingled with numerous scales of epithelium. According to Bidder and Schmidt, the composition of saliva is as follows:

Water, . . . . .	995.16
Organic matter, . . . . .	1.34
Sulpho-cyanide of Potassium, . . . . .	0.06
Phosphates of Sodium, Calcium and Magnesium, . . . . .	.98
Chlorides of Sodium and Potassium, . . . . .	.84
Mixture of Epithelium, . . . . .	1.62
	<hr/>
	1000.00

Two kinds of organic matter are present in the saliva; one, termed *ptyalin*, imparts to the saliva its viscidness, and is obtained from the secretions of the parotid, submaxillary and sublingual glands; another, which is not glutinous, is distinguished by the property of coagulating when subjected to heat. The saliva is composed of four elementary secretions, derived respectively, from the mucous follicles of the mouth, and the parotid, the submaxillary, and the sublingual glands. The process of its secretion is constant, but is greatly augmented by the contact of food with the lining membrane. The saliva serves to moisten the triturated food, facilitate its passage, and has the property of converting starch into sugar; but the latter quality is counteracted by the action of the gastric juice of the stomach.

**Gastric Juice.** The minute tubes, or follicles, situated in the mucous membrane of the stomach, secrete a colorless, acid liquid, termed the gastric juice. This fluid appears to consist of little more than water, containing a few saline matters in solution, and a small quantity of free hydrochloric acid, which gives it an acid reaction. In addition to these, however, it contains a small quantity of a peculiar organic substance, termed *pepsin*, which in chemical composition, is very similar to ptyalin, although it is very different in its effects. When food is introduced into the stomach, the peristaltic contractions of that organ roll it about, and mingle it with the gastric juice, which disintegrates the connective tissue, and converts the albuminous portions into the substance called chyme, which is about the consistency of pea-soup, and which is readily absorbed through the animal membranes into the blood of the delicate and numerous vessels of the stomach, whence it is conveyed to the portal vein and to the liver. The secretion of the gastric juice is influenced by nervous conditions. Excess of joy or grief effectually retard or even arrest its flow.

**Intestinal Juice.** In the small intestine, a secretion is found which is termed the *intestinal juice*. It is the product of two classes of glands situated in the mucous membrane,

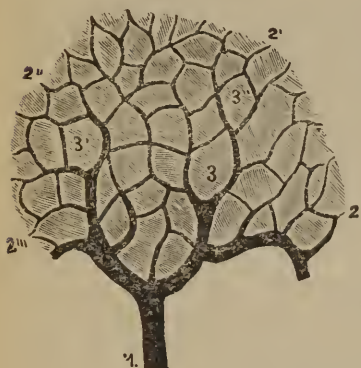
and termed respectively, the *follicles of Lieberkuhn* and the *glands of Brunner*. The former consist of numerous small tubes, lined with epithelium, which secrete by far the greater portion of this fluid. The latter are clusters of round follicles opening into a common excretory duct. These sacs are composed of delicate, membranous tissue, having numerous nuclei on their walls. The difficulty of obtaining this juice for experiment is obvious, and therefore its chemical composition and physical properties are not known. The intestinal juice resembles the secretion of the mucous follicles of the mouth, being colorless, vitreous in appearance, and having an alkaline reaction.

**Pancreatic Juice.** This is a colorless fluid, secreted in a lobular gland which is situated behind the stomach, and runs transversely from the spleen across the vertebral column to the duodenum. The most important constituent of the pancreatic juice is an organic substance, termed *pancreatin*.

**The Bile.** The blood which is collected by the veins of the stomach, pancreas, spleen, and intestines, is discharged into a large trunk called the portal vein, which enters the liver. This organ also receives arterial blood from a vessel called the *hepatic artery*, which is given off from the aorta below the diaphragm. If the branches of the portal vein and hepatic artery be traced into the substance of the liver, they will be found to accompany one another, and to subdivide, becoming smaller and smaller. Finally, the portal vein and hepatic artery will be found to terminate in capillaries which permeate the smallest perceptible subdivisions of the liver substance, which are polygonal masses of not more than one-tenth of an inch in diameter, called the *lobules*. Every lobule rests upon one of the ramifications of a great vessel termed the *hepatic vein*, which empties into the inferior vena cava. There is also a vessel termed the *hepatic duct* leading from the liver, the minute subdivisions of which penetrate every portion of the substance of that organ. Connected with the hepatic duct, is the duct of a large oval sac, called the *gall-bladder*.

Each lobule of the liver is composed of minute cellular bodies known as the *hepatic cells*. It is supposed that in these cells the blood is deprived of certain materials which are converted into bile. This secretion is a glutinous fluid, varying in color from a dark golden brown to a bright yellow, has a specific gravity ranging from 1018 to 1036, and a slightly alkaline reaction. When agitated, it has a frothy appearance. Physiologists have experienced much difficulty in studying the character of this secretion from the instability of its constituents when subjected to chemical examination.

Fig. 52.



Section of the Liver, showing the ramifications of the portal vein. 1. Twig of portal vein. 2, 2', 2'', 2''' Interlobular vein. 3, 3', 3'' Lobules.

*Biliverdin* is an organic substance peculiar to the bile, which imparts to that secretion its color. When this constituent is re-absorbed by the blood and circulates through the tissues, the skin assumes a bright yellow hue, causing what is known as the jaundice. *Cholesterin* is an inflammable crystallizable substance soluble in alcohol or ether. It is found in the spleen and all the nervous tissues. It is highly probable that it exists in the blood, in some state or combination, and assumes a crystalline form only when acted upon by other substances or elements. Two other constituents,

more important than either of the above, are collectively termed *biliary salts*. These elements were discovered in 1848, by Strecker, who termed them *glycocholate* and *taurocholate of soda*. Both are crystalline, resinous substances, and, although resembling each other in many respects, the chemist may distinguish them by their reaction, for both yield a precipitate if treated with subacetate of lead, but only the glycocholate will give a precipitate with acetate of lead. In testing for biliary substances, the most satisfactory method is the one proposed by Pettenkoffer. A solution of cane-sugar, one part of sugar to four parts of water, is mixed with the suspected substance.

Dilute sulphuric acid is then added until a white precipitate falls, which is re-dissolved in an excess of the acid. On the addition of more sulphuric acid, it becomes opalescent, and passes through the successive hues of scarlet, lake, and a rich purple. Careful experiments have proved that it is a *constant* secretion; but its flow is more abundant during digestion. During the passage through the intestines it disappears. It is not eliminated, and Pettenkoffer's test has failed to detect its existence in the portal vein. These facts lead physiologists to the conclusion, that it undergoes some transformation in the intestines and is re-absorbed.

After digestion has been going on in the stomach for some time, the semi-digested food, in the form of chyme, begins to pass through the *pyloric orifice* of the stomach into the duodenum, or upper portion of the small intestine. Here it encounters the intestinal juice, pancreatic juice, and the bile, the secretion of all of which is stimulated by the presence of food in the alimentary tract. These fluids, mingling with the chyme, give it an alkaline reaction, and convert it into chyle. The transformation of starch into sugar, which is almost, if not entirely, suspended while the food remains in the stomach, owing to the acidity of the chyme, is resumed in the duodenum, the acid of the chyme, being neutralized by the alkaline secretions there encountered.

Late researches have demonstrated that the pancreatic juice exerts a powerful effect on albuminous matters, not unlike that of the gastric juice.

Thus, it seems that while in the mouth only starchy, and while in the stomach only albuminous substances are digested, in the small intestine all kinds of food materials, starchy, albuminoid, fatty and mineral, are either completely dissolved, or minutely subdivided, and so prepared that they may be readily absorbed through the animal membranes into the vessels.

**Milk.** The milk is a white, opaque fluid, secreted in the lacteal glands of the female, in the mammalia. These glands consist of numerous follicles, grouped around an excretory

duct, which unites with similar ducts coming from other lobules. By successive unions, they form large branches, termed the *lactiferous ducts*, which open by ten to fourteen minute orifices on the extremity of the nipple. The most important constituent of milk is *casein*; it also contains oily and saccharine substances. This secretion, more than any other, is influenced by nervous conditions. A mother's bosom will fill with milk at the thought of her infant child. Milk is sometimes poisoned by a fit of ill-temper, and the infant made sick and occasionally thrown into convulsions, which in some instances prove fatal. Sir Astley Cooper mentions two cases in which terror instantaneously and permanently arrested this secretion. It is also affected by the food and drink. Malt liquors and other mild alcoholic beverages temporarily increase the amount of the secretion, and may, in rare instances, have a beneficial effect upon the mother. They sometimes affect the child, however, and their use is not to be recommended unless the mother is extremely debilitated, and there is a deficiency of milk.

## CHAPTER XXII

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# PHYSIOLOGICAL ANATOMY.

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### EXCRETION.

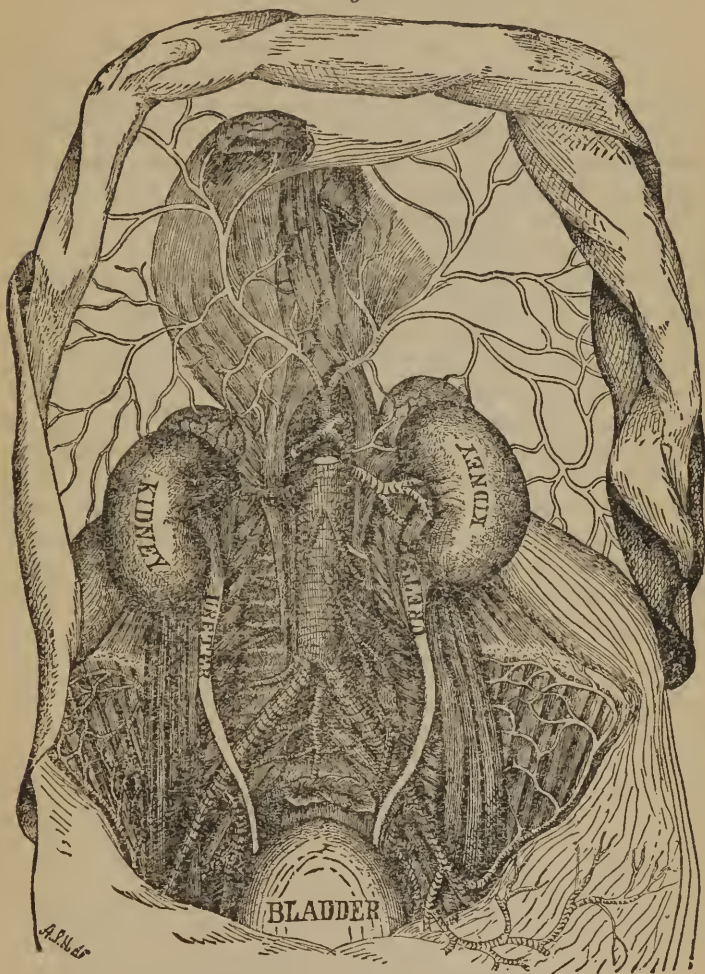
The products resulting from the waste of the tissues are constantly being poured into the blood, and, as we have seen, the blood being everywhere full of corpuscles, which, like all living things, die and decay, the products of their decomposition accumulate in every part of the circulatory system. Hence, if the blood is to be kept pure, the waste materials incessantly poured into this fluid, or generated in it, must be as continually removed, or excreted. The principal sets of organs concerned in effecting the separation of excrementitious substances from the blood are the lungs, the skin, and the kidneys.

The elimination of carbonic acid through the lungs has already been described, and the excretory function of the skin.

The kidneys are two bean-shaped organs, placed at the back of the abdominal cavity, in the region of the loins, one on each side of the spine. The convex side of each kidney is directed outwards, and the concave side is turned inwards towards the spine. From the middle of the concave side, which is termed the *hilus*, a long tube of small caliber, called the *ureter*, proceeds to the bladder. The latter organ is an oval bag, situated in the pelvic cavity. It is composed principally of elastic muscular fibers, and is lined internally with mucous membrane, and coated externally with a layer of the *peritoneum*, the serous membrane which lines the abdominal

and pelvic cavities. The ureters enter the bladder through its posterior and lower wall, at some little distance from each

*Fig 53.*



View of the Kidneys, Ureters, and Bladder.

other. The openings through which the ureters enter the bladder are oblique, hence it is much easier for the secretion

of the kidneys to pass from the ureters into the bladder than for it to get the other way. Leading from the bladder to the exterior of the body is a tube, called the *urethra*, through which the urine is voided.

The excretion of the kidneys, termed the *urine*, is an amber-colored or straw-colored fluid, naturally having a slightly acid reaction, and a specific gravity ranging from 1,015 to 1,025. Its principal constituents are *urea* and *uric acid*, together with various other animal matters of less importance, and saline substances, held in solution in a proportionately large amount of water. The composition of the urine and the quantity excreted vary considerably, being influenced by the moisture and temperature of the atmosphere, by the character of the food consumed, and by the empty or replete condition of the alimentary tract. On an average a healthy man secretes about fifty ounces of urine in the twenty-four hours. This quantity usually holds in solution about one ounce of urea, and ten or twelve grains of uric acid. In the amount of other animal matters, and saline substances, there is great variation, the quantity of these ranging from a quarter of an ounce to an ounce. The principal saline substances are common salt, the sulphates and phosphates of potassium, sodium, calcium, and magnesium. In addition to the animal and the saline matters, the urine also contains a small quantity of carbonic acid, oxygen and nitrogen.

## CHAPTER XXIII

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# PHYSIOLOGICAL ANATOMY.

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### THE NERVOUS SYSTEM.

Hitherto, we have only considered the anatomy and functions of the organs employed in Digestion, Absorption, Circulation, Respiration, Secretion and Excretion. We have found the vital process of nutrition to be, in all its essential features, a result of physical and chemical forces; in each instance we have presupposed the existence and activity of the nerves. There is not an inch of bodily tissue into which their delicate filaments do not penetrate, and from a multitude of conductors, over which are sent the impulses of motion and sensation.

Two elements, *nerve-fibers* and *ganglionic corpuscles*, enter into the composition of nervous tissue. Ordinary nerve-fibers in the living subject, or when fresh, are cylindrical-shaped filaments of a clear, but somewhat oily appearance. But soon after death the matter contained in the fiber coagulates, and then the fiber is seen to consist of an extremely delicate, structureless, outer membrane, which forms a tube through the center of which runs the *axis-cylinder*. Interposed between the axis-cylinder and this tube, there is a fluid, containing a considerable quantity of fatty matter, from which is deposited a highly refracting substance which lines the tube. There are two sets of nerve-fibers, those which transmit sensory impulses, called *afferent* or *sensory* nerves, and those which transmit motor impulses, called *efferent* or *motor* nerves. The fibers when collected in bundles are termed nerve trunks. All the larger nerve-fibers lie side by side in the nerve-trunks, and are bound together by delicate

*Fig. 54.*

connective tissue, enclosed in a sheath of the same material, termed the *neurilemma*. The nerve-fibers in the trunks of the nerves remain perfectly distinct and disconnected from one another, and seldom, or never, divide throughout their entire length. However, where the nerves enter the nerve-centers, and near their outer terminations, the nerve-fibres often divide into branches, or at least gradually diminish in size, until, finally, the axis-cylinder, and the sheath with its fluid contents, are no longer distinguishable. The investing membrane is continuous from the origin to the termination of the nerve-trunk.

In the brain and spinal cord the nerve-fibers often terminate in minute masses of a gray or ash-colored granular substance, termed *ganglia* or *ganglionic corpuscles*.

The ganglia are cellular corpuscles of irregular form, and possess fibrous appendages, which serve to connect them with one another. These ganglia form the cortical covering of the brain, and are also found in the interior of the spinal cord. According to Kölliker, the larger of these nerve-cells measure only  $\frac{1}{200}$  of an inch in diameter. The brain is chiefly composed of nervous ganglia.

Nerves are classified with reference to their origin, as *cerebral*—those originating in the brain, and *spinal*—those originating in the spinal cord.

There are two sets of nerves and nerve-centers, which are intimately connected, but which can be more conveniently studied apart. These are the *cerebro-spinal* system, consisting of the cerebro-spinal axis, and the cerebral and spinal nerves; and the *sympathetic* system, consisting of the chain of the sympathetic ganglia, the nerves which they give off, and the nervous trunks which connect them with one another and with the cerebro-spinal nerves.

## THE CEREBRO-SPINAL SYSTEM.

**The Cerebro-Spinal Axis** consists of the brain and spinal cord. It lies in the cavities of the cranium and the spinal column. These cavities are lined with a very tough

Fig. 55.



Division of a nerve, showing a portion of a nervous trunk (a) and separation of its filaments (b, c, d, e.)

fibrous membrane, termed the *dura mater*, which serves as the periosteum of the bones which enter into the formation of these parts. The surface of the brain and spinal cord is closely invested with an extremely vascular, areolar tissue, called the *pia mater*. The numerous blood-vessels which supply these organs traverse the pia mater for some distance, and, where they pass into the substance of the brain or spinal cord, the fibrous tissue of this membrane accompanies them to a greater or less depth. The inner surface of the dura mater and the outer surface of the pia mater are covered with an extremely thin, serous membrane, which is termed the *arachnoid* membrane. Thus, one layer of the arachnoid envelopes the brain and spinal cord, and the other lines the dura mater. As

Fig. 56.



Cross-section of Spinal Cord.

the layers become continuous with each other at different points, the arachnoid, like the pericardium, forms a shut sac, and, like other serous membranes, it secretes a fluid, known as the *arachnoid fluid*. The space between the internal and the external

layers of the arachnoid membrane of the brain is much smaller than that enclosed by the corresponding layers of the arachnoid membrane of the spinal column.

**The Spinal Cord** is a column of soft, grayish-white substance, extending from the top of the spinal canal, where it is continuous with the brain, to about an inch below the small of the back, where it tapers off into a filament. From this nerve are distributed fibers and filaments to the muscles and integument of at least nine-tenths of the body.

The spinal cord is divided in front through the middle nearly as far as its center, by a deep fissure, called the *anterior fissure*, and behind, in a similar manner, by the *posterior fissure*. Each of these fissures is lined with the pia mater, which also supports the blood-vessels which supply the spinal cord with blood. Consequently, the substance of the two halves of the cord is only connected by a narrow

isthmus, or bridge, perforated by a minute tube, which is termed the *central canal* of the spinal cord.

Each half of the spinal cord is divided lengthwise into three nearly equal parts, which are termed the anterior, lateral, and posterior columns, by the lines which join together two parallel series of bundles of nervous filaments, which compose the roots of the spinal nerves. The roots of those nerves, which are found along that line nearest the posterior surface of the cord, are termed the posterior roots; those which spring from the other line are known as the anterior roots.

Several of these anterior and posterior roots, situated at about the same height on opposite sides of the spinal cord, converge and combine into what are called the *anterior* and *posterior bundles*; then two bundles, anterior and posterior, unite and form the trunk of a spinal nerve.

The nerve trunks make their way out of the spinal canal through apertures between the vertebra, called the *inter-vertebral foramina* and then divide into numerous branches, their ramifications extending principally to the muscles and the skin. There are thirty-one pairs of spinal nerves, eight of which are termed cervical, twelve dorsal, five lumbar, and six sacral, with reference to that part of the cord from which they originate.

When the cord is divided into transverse sections, it is found that each half is composed of two kinds of matter, a white substance on the outside, and a grayish substance in the interior. The *gray matter*, as it is termed lies in the form of an irregular crescent, with one end considerably larger than the other, and having the concave side turned outwards. The ends of the crescent are termed the *horns*, or *cornua*, the one pointing forward being called the *anterior cornu*, the other one the *posterior cornu*. The convex sides of these cornua approach each other and are united by the bridge, which contains the central canal.

There is a marked difference in the structure of the gray and the white matter. The white matter is composed entirely of nerve fibers, held together by a framework of connective tissue. The grey matter contains a great number of ganglionic corpuscles, or nerve-cells, in addition to the nerve-fibers.

When the nerve-trunks are irritated in any manner, whether by pinching, burning, or the application of electricity, all

the muscles which are supplied with branches from this nerve-trunk immediately contract, and pain is experienced, the severity of which depends upon the degree of the irritation; and the pain is attributed to that portion of the body to which the filaments of the nerve-trunk are distributed. Thus, persons who have lost limbs often complain in cold weather of an uneasiness or pain, which they locate in the fingers or toes of the limb which has been amputated, and which is caused by the cold producing an irritation of the nerve-trunk, the filaments, or fibers of which, supplied the fingers or toes of the lost member.

On the other hand, if the anterior bundle of nerve-fibers given off from the spinal cord is irritated in precisely the same way, only half of these effects is produced. All the muscles which are supplied with fibers from that trunk contract, but no pain is experienced. Conversely, if the posterior bundle of nerve-fibers is irritated, none of the muscles to which the filaments of the nerve are distributed contract, but pain is felt throughout the entire region to which these filaments are extended. It is evident, from these facts, that the fibers composing the posterior bundles of nerve-roots only transmit sensory impulses, and the filaments composing the anterior nerve-roots only transmit motor impulses; accordingly, they are termed respectively the *sensory* and the *motor* nerve-roots. This is illustrated by the fact that when the posterior root of a spinal nerve is divided, all sensation in the parts to which the filaments of that nerve are distributed is lost, but the power of voluntary movement of the muscles remains. On the other hand, if the anterior roots are severed, the power of voluntary motion of the muscles is lost, but sensation remains.

It appears from these experiments, that, when a nerve is irritated, a change in the arrangement of its molecules takes place, which is transmitted along the nerve-fibers. But, if the nerve-trunks are divided, or compressed tightly at any point between the portion irritated, and the muscle or nerve-centre, the effect ceases immediately, in a manner similar to that in which a message is stopped by the cutting of a telegraph wire. When the nerves distributed to a limb are subjected to a pressure sufficient to destroy the molecular continuity of their filaments, it "goes to sleep," as we term it. The power

of transmitting sensory and motor impulses is lost, and only returns gradually, as the molecular continuity is restored.

From what has been said, it is plain that a sensory nerve is one which conveys a sensory impulse from the peripheral or outer part of a nerve to the spinal cord or brain, and which is, therefore, termed *afferent*; and that a motor nerve is one which transmits an impulse from the nerve centre, or is *efferent*. No difference in structure, or in chemical or physical composition, can be discerned between the afferent and the efferent nerves. A certain period of time is required for the transmission of all impulses. The speed with which an impulse travels has been found to be comparatively slow, being even less than that of sound, which is 1,120 feet per second.

The experiments heretofore related have been confined solely to the nerves. We may now proceed to the consideration of what takes place when the spinal cord is operated upon in a similar way. If the cord be divided with a knife or other instrument, all parts of the body supplied with nerves given off below the division will become paralyzed and insensible, while all parts of the body supplied with nerves from the spinal cord *above* the division will retain their sensibility and power of motion. If, however, only the posterior half of the spinal cord is divided, or destroyed, there is loss of sensation alone; and, if the anterior portion is cut in two, and the continuity of the posterior part is left undisturbed, there is loss of voluntary motion of the lower limbs, but sensation remains.

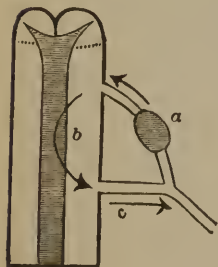
**Reflex Action of the Spinal Cord.** In relation to the brain, the spinal cord is a great mixed motor and sensory nerve, but, in addition to this, it is also a distinct nervous centre, in which originate and terminate all those involuntary impulses which exert so potent an influence in the preservation and economy of the body. That peculiar power of the cord, by which it is enabled to convert sensory into motor impulses, is that which distinguishes it, as a central organ, from a nerve, and is called *reflex action*.

The gray matter, and not the white, is the part of the cord which possesses this power. This reflex action is a special func-

tion of the spinal cord, and serves as a monitor to, and regulator of the organs of nutrition and circulation, by placing them, ordinarily, beyond the control of conscious volition.

If the foot of a decapitated frog is irritated, there is an instant contraction of the corresponding limb; if the irritation is intense the other limb also contracts. These motions indicate the existence, in some part of the spinal cord, of a distinct nerve-centre, capable of converting and reflecting impulses. It has been found by experiment, that the same movements will

*Fig. 57.*



take place if the irritation be applied to any portion of the body to which the spinal nerves are distributed, thus giving undoubted evidence that the spinal cord in its entirety is capable of causing these reflections. Fig. 57 represents the course of the nervous impulses. The sensory impulse passes upward along the posterior root, *a*, until it reaches the imbedded gray matter, *b*, of the cord, by which it is reflected, as a motor impulse, downward along the anterior root, *c*, to the muscles

whence the sensation was received. This is the reflex action of the spinal cord. There is no consciousness or sensation connected with this action, and the removal of the brain and the sympathetic system does not diminish its activity. Even after death it continues for some time, longer in cold-blooded than in warm-blooded animals, on account of the difference in temperature, thus showing this property of the spinal cord. By disease, or the use of certain poisons, this activity may be greatly augmented, as is frequently observed in the human subject. A sudden contact with a different atmosphere may induce these movements. The contraction of the muscles, or cramp, often experienced by all persons, in stepping into a cold bath, or emerging from the cozy sitting-room into a chilly December temperature, are familiar illustrations of reflex movements. It has been demonstrated that the irritability of the nerves may be impaired or destroyed, while

that of the muscles to which they are distributed remains unchanged; and that the motor and sensory classes of filaments may be paralyzed independently of each other.

The reflex actions of the spinal cord have been admirably summed up by Dr. Dalton, as exerting a general, protective influence over the body, presiding over the involuntary action of the limbs and trunk, regulating the action of the sphincters, rectum, and bladder, and, at the same time, exercising an indirect influence upon the nutritive changes in all parts of the body to which the spinal filaments are distributed.

**The Brain.** The brain is a complex organ, which is divided into the *medulla oblongata*, the *cerebellum*, and the *cerebrum*.

The *medulla oblongata* is situated just above the spinal cord, and is continuous with it below, and the brain above. It has distinct functions which are employed in the preservation and continuance of life. It has been termed the "vital knot," owing to the fact that the brain may be removed and the cord injured and still the heart and lungs will continue to perform their functions, until the *medulla oblongata* is destroyed.

The arrangement of the white and gray matter of the *medulla oblongata* is similar to that of the spinal cord; that is to say, the white matter is external and the gray internal; whereas in the *cerebellum* and *cerebrum* this order is reversed. The fibres of the spinal cord, before entering this portion of the brain, decussate, those from the right side crossing to the left, and those from the left crossing to the right side. By some authors this crossing of the sensory and motor filaments has been supposed to take place near the *medulla oblongata*. Dr. Brown-Sequard shows, however, that it takes place at every part of the spinal cord. The *medulla oblongata* is traversed by a longitudinal fissure, continuous with that of the spinal cord. Each of the lateral columns thus formed are subdivided into sections, termed respectively the *Corpora Pyramidalia*, the *Corpora Olivaria*, the *Corpora Restiformia* and the *Posterior Pyramids*.

The *Corpora Pyramidalia* (see 1, 1, Fig. 58) are two small medullary eminences or cords, situated at the posterior surface of the medulla oblongata; approaching the Pons Varolii they become larger and rounded.

The *Corpora Olivaria* (3, 3, Fig. 58) are two elliptical prominences, placed exterior to the corpora pyramidalia. By some physiologists these bodies are considered as the nuclei, or vital points, of the medulla oblongata. Being closely connected with the nerves of special sensation, Dr. Solly supposed that they preside over the movements of the larynx.

Fig. 58.

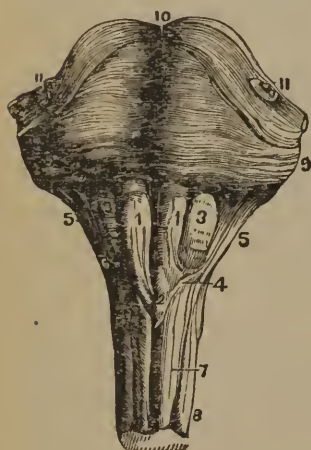
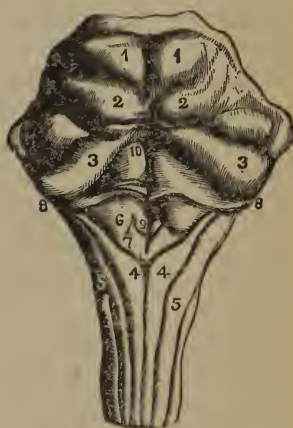


Fig. 59.



The *Corpora Restiformia* (5, 5, Fig. 59) are lateral and posterior rounded projections of whitish medulla, which pass upward to the cerebellum and from the *crura cerebelli*, so called because they resemble a leg. The filaments of the pneumogastric nerve originate in the ganglia of these parts.

The *Posterior Pyramids* are much smaller than the other columns of the medulla oblongata. They are situated (4, 4, Fig. 59) upon the margin of the posterior fissures in contact with each other.

The functions of the medulla oblongata, which begin with the earliest manifestations of life, are of an instinctive

character. If the cerebellum and cerebrum of a dove be removed, the bird will make no effort to procure food, but if a crumb of bread be placed in its bill, it is swallowed naturally and without any special effort. So also in respiration, the lungs continue to act after the inter-costal muscles are paralyzed; if the diaphragm loses its power, suffocation is the result, but there is still a convulsive movement of the lungs for sometime, indicating the continued action of the medulla oblongata.

The *Cerebellum*, or little brain, is situated in the posterior chamber of the skull, beneath the *tentorium*, a tent-like process of the dura mater which separates it from the cerebrum. It is convex, with a transverse diameter of between three and one-half and four inches, and is little more than two inches in thickness. It is divided on its upper and lower surfaces into two lateral hemispheres, by the superior and inferior vermiform processes, and behind by deep notches. The cerebellum is composed of gray and white matter, the former being darker than that of the cerebrum. From the beautiful arrangement of tissue, this organ has been termed the *arbor vitæ*.

The *peduncles of the cerebellum*, the means by which it communicates with the other portions of the brain, are divided into three pairs, designated as the *superior*, *middle* and *inferior*. The first pass upward and forward until they are blended with the tubercles of the *corpora quadrigemina*. The second are the *crura cerebelli*, which unite in two large *fasciculi*, or pyramids, and are finally lost in the *pons varolii*. The inferior peduncles are the *corpora restiformia*, previously described, and consist of both sensory and motor filaments. Some physiologists suppose that the cerebellum is the source of that harmony or associative power which co-ordinates all voluntary movements, and effects that delicate adjustment of cause to effect, displayed in muscular action. This fact may be proved by removing the cerebellum of a bird and observing the results, which are an uncertainty in all its movements, and difficulty in standing, walking, or flying, the bird being unable to direct its course. In the animal kingdom we find an apparent correspondence between the size of the cerebellum and the variety and extent of the movements of the animal. Instances are cited, however, in which no such proportion exists, and so the matter is open to controversy. The general function

of the cerebellum, therefore, cannot be explained, but the latest experiments in physiological and anatomical science seem to favor the theory that it is in some way connected with the harmony of the movements. This co-ordination, by which the adjustment of voluntary motion is supposed to be effected, is not in reality a *faculty* having its seat in the brain substance, but is the harmonious action of many forces through the cerebellum.

The *Cerebrum* occupies five times the space of all the other portions of the brain together. It is of an ovoid form, and becomes larger as it approaches the posterior region of the skull. A longitudinal fissure covered by the *dura mater* separates the cerebrum into two hemispheres, which are connected at the base of the fissure, by a broad medullary band, termed the *corpus callosum*. Each hemisphere is subdivided into three lobes. The anterior gives form to the forehead, the middle rests in the cavity at the base of the skull, and the posterior lobe is supported by the tentorium, by which it is separated from the cerebellum beneath. One of the most prominent characteristics of the cerebrum is its many and varied *convolutions*. These do not correspond in all brains, nor even on the opposite side of the same brain, yet there are certain features of similarity in all; accordingly, anatomists enumerate four *orders of convolutions*. The first order begins at the *substantia perforata* and passes upward and around the corpus callosum toward the posterior margin of that body, thence descends to the base of the brain, and terminates near its origin. The second order originates from the first, and subdivides into two convolutions, one of which composes the exterior margin and superior part of the corresponding hemisphere, while the other forms the circumference of the *fissure of Sylvius*. The third order, from six to eight in number, is found in the interior portion of the brain, and inosculates between the first and second orders. The fourth is found on the outer surface of the hemisphere, in the space between the sub-orders of the second class. A peculiar fact relating to these convolutions is observed by all anatomists: mental

development is always accompanied by an increasing dissimilarity between their proportional size.

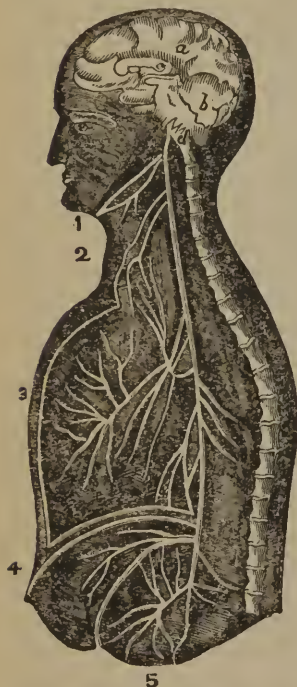
The cerebral hemispheres may be injured or lacerated without any pain to the patient. The effect seems to be one of stupefaction without sensation or volition. A well-developed brain is a very good indication of intelligence and mental activity. That the cerebrum is the seat of the reasoning powers, and all the higher intellectual functions, is proved by three facts. (1.) If this portion of the brain is removed, it is followed by the loss of intelligence. (2.) If the human cerebrum is injured, there is an impairment of the intellectual powers. (3.) In the animal kingdom, as a rule, intelligence corresponds to the size of the cerebrum. This general law of development is modified by differences in the cerebral texture. Men possessing comparatively small brains may have a vast range of thought and acute reasoning powers. Anatomists have found these peculiarities to depend upon the quantity of gray matter which enters into the composition of the brain.

In the cerebro-spinal system there are three different kinds of reflex actions. (1.) Those of the spinal cord and medulla oblongata are performed without any consciousness or sensation on the part of the subject. (2.) The second class embraces those of the tuber annulare, where the perception gives rise to motion without the interference of the intellectual faculties. These are denominated purely *instinctive* reflex actions, and include all those operations of animals which seem to display intelligent forethought; thus, the beaver builds his habitation over the water, but not a single apartment is different from the beaver homestead of a thousand years ago; there is no improvement, no retrogression. Trains of thought have been termed a third class of reflex actions. It is evident that the power of reasoning is, in a degree, possessed by some of the lower animals: for instance, a tribe of monkeys on a foraging expedition will station guards at different parts of the field, to warn the plunderers of the approach of danger. A cry from the sentinel, and general confusion is followed by retreat. Reason only attains its highest development in man, in whom it passes the bounds of ordinary existence, and, with the magic wand of love, reaches outward into the

vast unknown, lifting him above corporeal being, into an atmosphere of spiritual and divine Truth.

**The Cranial Nerves.** From the brain, nerves are

Fig. 60.



Section of the brain and an ideal view of the pneumogastric nerve on one side, with its branches. *a.* Vertical section of the cerebrum. *b.* Section of the cerebellum. *c.* Corpus callosum. *d.* Lower section of medulla oblongata. Above *d.* origin of the pneumogastric nerve. 1. Pharyngeal branch. 2. Superior laryngeal. 3. Branches to the lungs. 4. Branches to the liver. 5. Branches to the stomach.

given off in pairs, which succeed one another from in front backwards to the number of twelve. The *first* pair, the *olfactory* nerves, are the nerves of the sense of smell. The *second* pair are the *optic*, or the nerves of the sense of sight. The *third* pair are called the *motores oculi*, the movers of the eye, from the fact that they are distributed to all the muscles of the eye with the exception of two. The *fourth* pair and the *sixth* pair each supply one of the muscles of the eye, on each side, the fourth extending to the superior oblique muscle, and the sixth to the external rectus muscle. The nerves of the *fifth* pair are very large; they are each composed of two bundles of filaments, one motor and the other sensory, and have, besides, an additional resemblance to a spinal nerve by having a ganglion on each of their sensory roots, and, from the fact that they have three chief divisions, are often called the *trigeminal*, or *trifacial*, nerves. They are nerves of special sense, of sensation, and of motion. They are the sensitive nerves which supply the cranium and face, the motor nerves of the muscles of mastication, the *buccinator* and the *masseter*, and their third branches, often called the *gustatory*, are distributed to the front portion of the tongue, and are two of the nerves of the special sense of taste. The *seventh* pair, called also the *facial* nerves, are

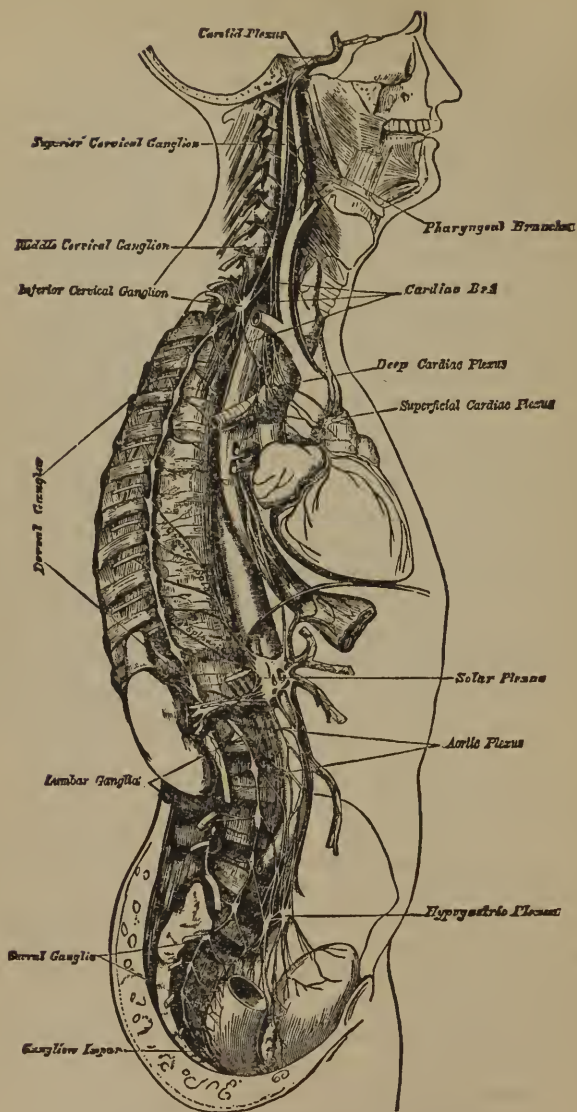
the motor nerves of the muscles of the face, and are also distributed to a few other muscles; the *eighth* pair, termed the auditory nerves, are the nerves of the special sense of hearing. As the *seventh* and *eighth* pairs of nerves emerge from the cavity of the skull together, they are frequently classed by anatomists as one, divided into the *facial* or *portio dura*, as it is sometimes called, and the *auditory*, or *portio mollis*. The *ninth* pair, called the *glosso-pharyngeal*, are mixed nerves, supplying motor filaments to the *pharyngeal muscles* and filaments of the special sense of taste to the back portion of the tongue. The *tenth* pair, called the *pneumogastric*, or *par vagum*, are very important nerves, and are distributed to the larynx, the lungs, the heart, the stomach, and the liver, as shown in Fig. 60. This pair and the next are the only cerebral nerves which are distributed to parts of the body distant from the head. The *eleventh* pair, also called *spinal accessory*, arise from the sides of the spinal marrow, between the anterior and posterior roots of the dorsal nerves, and run up to the medulla oblongata, and leave the cranium by the same aperture as the pneumogastric and glosso-pharyngeal nerves. They supply certain muscles of the neck, and are purely motor. As the glosso-pharyngeal, pneumogastric, and spinal accessory nerves leave the cranium together, they are by some anatomists counted as the *eighth* pair. The *twelfth* pair, known as the *hypo-glossal*, are distributed to the tongue, and are the motor nerves of that organ.

### THE GREAT SYMPATHETIC.

A double chain of nervous ganglia extends from the superior to the inferior parts of the body, at the sides and in front of the spinal column, and is termed, collectively, the system of the *great sympathetic*. These ganglia are intimately connected by nervous filaments, and communicate with the cerebro-spinal system by means of the motor and sensory filaments which penetrate the sympathetic. The nerves of this system are distributed to those organs over which conscious volition has no direct control.

Four of the sympathetic centers, situated in the front and lower portions of the head, are designated as the *ophthalmic*, *spheno-palatine*, *submaxillary* and *otic ganglia*. The first of these, as its name indicates, is distributed to the eye, pene-

Fig. 61.



Course and distribution of the Great Sympathetic Nerve.

trates the *sclerotic membrane* (the white, opaque portion of the eyeball, with its transparent covering), and influences the contraction and dilation of the iris. The second division is situated in the angle formed by the sphenoid and maxillary bone, or just below the ear. It sends motor and sensory filaments to the palate, and *velum palati*. Its filaments penetrate the carotid plexus, are joined by others from the motor roots of the facial nerve and the sensory fibres of the superior maxillary. The third division is located on the submaxillary gland. Its filaments are distributed to the sides of the tongue, the sublingual, and submaxillary glands. The otic ganglion is placed below the base of the skull, and also connects with the *carotid plexus*. Its filaments of distribution supply the internal muscles of the *malleus*, the largest bones of the *tympanum*, the membranous linings of the tympanum and the *eustachian tube*. Three ganglia, usually designated as the *superior*, *middle*, and *inferior*, connect with the cervical and spinal nerves. Their interlacing filaments are distributed to the muscular walls of the larynx, pharynx, trachea, and esophagus, and also penetrate the *thyroid gland*. The use of this gland is not accurately known. It is composed of a soft, brown tissue, and consists of lobules contained in lobes of larger size. It forms a spongy covering for the greater portion of the larynx, and the first section of the trachea. That it is an important organ, is evident from the fact that it receives four large arteries, and filaments from two pairs of nerves.

The sympathetic ganglia of the chest correspond in number with the terminations of the ribs, over which they are situated. Each ganglion receives two filaments from the intercostal nerve, situated above it, thus forming a double connection. The thoracic ganglia supply with motor fibers that portion of the aorta which is above the diaphragm, the esophagus, and the lungs.

In the abdomen the sympathetic centers are situated upon the *cæliac* artery, and are termed, collectively, the *semilunar, cæliac ganglion*. Numerous inosculating branches radiate from this center and are called, from the method of their distribution, the *solar plexus*. From this, also, originate other plexi which are distributed to the stomach, liver, kidneys, intestines, spleen, pancreas, supra-renal glands, and to the organs of generation. Four other pairs of abdominal ganglia

connected with the lumbar branches are united by filaments to form the semilunar ganglion.

The sympathetic ganglia of the pelvis consist of five pairs, which are situated upon the surface of the sacrum. At the extremity of the spinal column this system terminates in a single knot, designated as the *ganglion impar*.

Owing to the position of the sympathetic ganglia, deeply imbedded in the tissues of the chest and abdomen, it is exceedingly difficult to subject them to any satisfactory experiments. A few isolated facts from the basis of all our knowledge concerning their functions. They give off both motor and sensory filaments. The contraction of the *iris* is one of the most familiar examples of the action of the sympathetic system.

In the reflex actions of the nerves of special sense, the sensation is transmitted through the cerebro-spinal system, and the motor impulse is sent to the deep-seated muscles by the sympathetic system. Physiologists enumerate three kinds of reflex actions, which are either purely sympathetic, or partially influenced by the cerebro-spinal system. Dr. Dalton describes them as follows:

*First*.—"Reflex actions taking place from the internal organs, through the sympathetic and cerebro-spinal system, to the voluntary muscles and sensitive surfaces.—The convulsions of young children are often owing to the irritation of undigested food in the intestinal canal. Attacks of indigestion are also known to produce temporary amaurosis [blindness], double vision, strabismus, and even hemiplegia. Nausea, and a diminished or capricious appetite, are often prominent symptoms of early pregnancy, induced by the peculiar condition of the uterine mucous membrane."

*Second*.—"Reflex actions taken place from the sensitive surfaces, through the cerebro-spinal and sympathetic systems, to the involuntary muscles and secreting organs.—Imprudent exposure of the integument to cold and wet, will often bring on a diarrhea. Mental and moral impressions, conveyed through the special senses, will affect the motions of the heart, and disturb the processes of digestion and secretion. Terror, or an absorbing interest of any kind, will produce a dilatation of the pupil, and communicate in this way a peculiarly wild and

unusual expression to the eye. Disagreeable sights or odors, or even unpleasant occurrences, are capable of hastening or arresting the menstrual discharge, or of inducing premature delivery."

*Third.*—"Reflex actions taking place through the sympathetic system from one part of the body to another.—The contact of food with the mucous membrane of the small intestine excites a peristaltic movement in the muscular coat. The mutual action of the digestive, urinary, and internal generative organs upon each other takes place entirely through the medium of the sympathetic ganglia and their nerves. The variation of the capillary circulation in different abdominal viscera, corresponding with the state of activity or repose of their associated organs, are to be referred to a similar nervous influence. These phenomena are not accompanied by any consciousness on the part of the individual, nor by any apparent intervention of the cerebro-spinal system."

## CHAPTER XXIV

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# THE SPECIAL SENSES.

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### SIGHT.

The eye is the organ through which we perceive, by the agency of light, all the varied dimensions, relations, positions, and visible qualities of external objects.

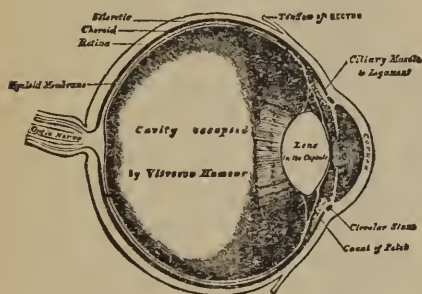
The number, position, and perfection of the eyes, vary remarkably in different orders, in many instances corresponding to the mode of life, habitation, and food of the animal. A skillful anatomist may ascertain by the peculiar formation of the eye, without reference to the general physical structure, in what element the animal lives. Sight is one of the most perfect of the senses, and reveals to man the beauties of creation. The æsthetic sentiment is acknowledged to be the most refining element of civilized life. Painting, sculpture, architecture, and all the scenes of nature, from a tiny wayside flower to a Niagara, are subjects in which the poet's eye sees rare beauties to mirror forth in the rhythm of immortal verse.

In the vertebrates, the organs of vision are supplied with filaments from the second pair of cranial nerves. In mammalia, the eyes are limited to two in number, which in man are placed in circular cavities of the skull, beneath the anterior lobes of the cerebrum. Three membranes form the lining of this inner sphere of the eye, called respectively the Sclerotic, Choroid, and Retina.

The *Sclerotic*, or outer covering, is the white, firm membrane, which forms the larger visible portion of the eyeball. It is covered in front by a colorless, transparent segment, termed the *cornea*, which gives the eye its lustrous appearance. Within

the sclerotic, and lining it throughout, is a thin, dark membrane, termed the *Choroid*. Behind the cornea it forms a curtain, called the *iris*, which gives the eye its color. The muscles of the iris contract or relax according to the amount of light received, thus enlarging or diminishing the size of the circular opening called the *pupil*. The *Retina* is formed by the optic nerve, which penetrates the sclerotic and choroid and spreads out into a delicate, grayish, semi-transparent membrane. The retina is one of the most *essential* organs of vision, and consists of two layers. A spheroidal, transparent body, termed the *crystalline lens*, is situated directly behind the pupil. It varies in density, increasing from without inward, and forms a

Fig. 62.



perfect refractor of the light received. The space in front of the crystalline lens is separated by the iris into two compartments, called respectively the *anterior* and *posterior chambers*. The fluid contained within them, termed the *aqueous humor*, is secreted by the cornea, iris, and

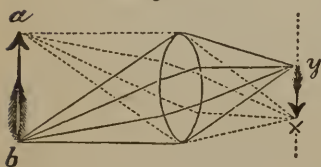
ciliary processes. The space behind the crystalline lens is occupied by a fluid, called the *vitreous humor*. This humor is denser than the other fluids and has the consistency of jelly, being perfectly transparent. "The function of the crystalline lens is to produce distinct perception of form and outline."\* The transparent humors of the eye also contribute to the same effect, but only act as auxiliaries to the lens.

The figure on the next page represents the course of the rays of light proceeding from an object *a b*, refracted by the lens, and forming the inverted image *xy* on the screen. All rays of light proceeding from *b* are concentrated at *y*, and those proceeding from *a* converge at *x*. Rays of light emanating from the center of the object *a b* pursue a parallel course, and form the center of the image. Rays of light passing

\* Dalton—Human Physiology,

through a double convex lens converge at a point called the *focus*. In the organ of vision, if perfect, the focus is on the retina, which serves as a screen to receive the image or impression. We have a distinct perception of the outline of a distant hill, and also of a book lying before us. The rays of light we receive from these objects cannot have the same focus. How, then, can we account for the evident accommodation of the eye to the varying distances? Various theories have been advanced to explain this adjustment; such as changes in the curvature of the cornea and lens; a movement of the lens, or a general change in the form of the eyeball, by which the axis may be lengthened or shortened.

Fig. 63.



Two facts comprise all the positive knowledge which we possess on this subject. Every person is conscious of a muscular effort in directing the eye to a near object, as a book, and of fatigue, if the attention is prolonged. If, now, the eyes be directed to a distant object, there will result a sense of rest, or passiveness. By various experi-

ments it has been proved that the accommodation or adjustment of the eye for near objects requires a muscular effort, but for distant objects the muscles are in an essentially passive condition. An increase in the convexity of the crystalline lens is now admitted to be necessary for a distinct perception of near objects. We may give two simple illustrations, cited by Dr. Dalton in his recent edition of *Human Physiology*. If a candle be held near the front of an eye which is directed to a distant object, three reflected images of the flame will be seen in the eye, one on each of the anterior surfaces of the cornea and lens, and a third on the posterior surface of the latter. If the eye is directed to a near object, the reflection on the cornea remains unchanged, while that on the anterior surface of the lens gradually diminishes and approximates in size the reflection on the cornea, thus giving conclusive evidence that, in viewing a near object, the anterior surface of the crystalline lens become *more convex*, and at the same time approaches the cornea. Five or six inches is the minimum limit of the muscular adjustment of the eye.

From that point to all the boundless regions of space, to every star and nebulae which send their rays to our planet, human vision can reach. It is the sense by which we receive knowledge of the myriads of worlds and suns which circle with unfailing precision through infinite space.

## HEARING.

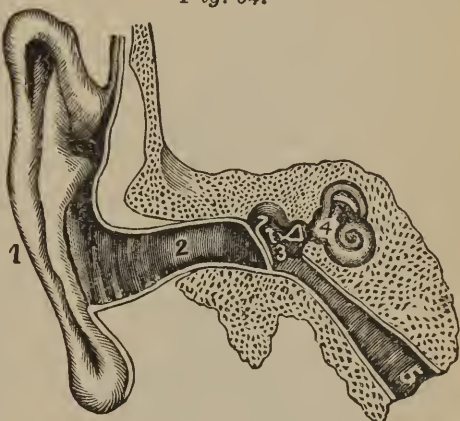
Hearing depends upon the sonorous vibrations of the atmosphere. The waves of sound strike the sensitive portions of the ear, and their impressions upon the auditory nerves are termed the sensations of hearing. The ear is divided into three parts, called respectively the External, Middle, and Internal ear.

The external organs of hearing are two in number, and placed on opposite sides of the head. In most of the higher order of vertebrates, they are so situated as to give expression and

proportion to the facial organs, and, at the same time, to suit the requirements of actual life.

The *External ear* is connected with the interior part by a prolongation of its orifice, termed the *external auditory meatus*. In man, this gristly portion of the auditory apparatus is about one inch in length, lined by a continuation of the integument of the ear, and has numerous hairs on its surface, to prevent the intrusion of foreign substances. Between the external meatus and the cavity of the middle ear is the *membrana tympani*, which is stretched across the opening like the head of a drum. The *tympanum*, or ear-drum, communicates with the pharynx by the *eustachian tube*, which is a narrow passage

Fig. 64.



Internal and External Ear.

1. External ear. 2. Internal auditory meatus.  
3. Tympanum. 4. Labyrinth. 5. Eustachian tube.

lined with delicate, ciliated epithelium. On the posterior portion it is connected with the *mastoid cells*. Three small bones are stretched across the cavity of the tympanum, and called, from their form, the *malleus*, *incus* and *stapes*, or the hammer, anvil, and stirrup. Agassiz mentions a fourth, which he terms the *os orbiculare*. Each wave of sound falling upon the *membrana tympani*, throws its molecules into vibrations which are communicated to the chain of bones, which, in turn, transmits them to the membrane of the *foramen ovale*. The three muscles which regulate the tension of these membranes are termed the *tensor tympani*, *laxator tympani*, and *stapedium tympani*.

The *Labyrinth*, or *Internal ear*, is a complicated cavity, consisting of three portions termed the *vestibule*, *cochlea*, and *semi-circular canals*. The vestibule is the central portion and communicates with the other divisions. The labyrinth is filled with a transparent fluid, termed *perilymph*, in which are suspended, in the vestibules and canals, small membranous sacs, containing a fluid substance, termed *endolymph* (sometimes called *vitrine auditive* from its resemblance to the vitreous humor of the eye). The filaments of the auditory nerve penetrate the membranous tissues of these sacs, and also of those suspended at the commencement of the semi-circular canals. These little sacs are supposed to be the seat of hearing, and to determine, in some mysterious way, the quality, intensity and pitch of sounds.

The determination of the *direction* of sound is a problem of acoustics. Some have contended that the arrangement of the semi-circular canals is in some way connected with this sensation. But this supposition, together with the theory of the transmission of sound through the various portions of the cranial bones, has been exploded.

From the foregoing description, it will be seen that the labyrinth and tympanum are the most essential parts of the organs of hearing. In delicacy and refinement this sense ranks next to sight. The emotions of beauty and sublimity, excited by the warbling of birds and the roll of thunder, are scarcely distinguishable from the intense emotions arising from sight. It is a remarkable fact, that the refinement or cultivation of these senses is always found

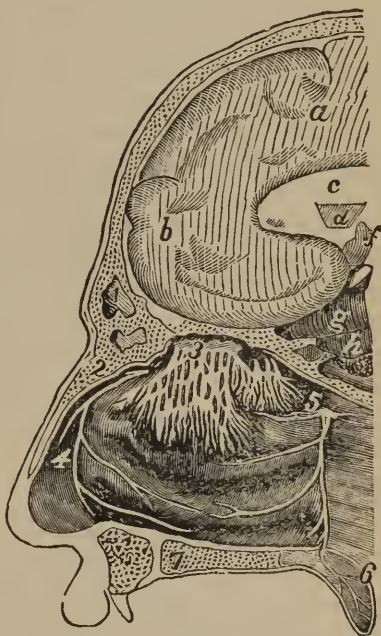
associated. Those nations which furnish the best artists, or have the highest appreciation of painting and sculpture, produce the most skillful musicians, those who reduce music to a science.

## SMELL.

Next in order of delicacy, and more closely allied with the physical functions, is the sense of smell. Delicate per-

fumes, or the fragrance of a flower, impart an exhilarating sensation of delight, while numerous odors excite a feeling of disgust. The organ of smell is far less complicated in its structure than the eye or the ear. It consists of two cavities having cartilaginous walls, and lined with a thick mucous coat, termed the *pituitary membrane*, over which are reflected the olfactory nerves. Particles of matter, too minute to be visible even through the microscope, are detached from the odorous body and come in contact with the nerves of smell, which transmit the impressions or impulses thus received to the brain. Fig. 65 shows the distribution of the olfactory nerves in the nasal passages. The nose is supplied with two kinds of filaments which are termed respectively nerves of

Fig. 65.



1. Frontal sinus. 2. Nasal bone. 3. Olfactory ganglion and nerves. 4. Nasal branch of the fifth pair. 5. Spheno-palatine ganglion. 6. Soft palate. 7. Hard palate. a. Cerebrum. b. Anterior lobes. c. Corpus callosum. d. Septum lucidum. f. Fornix. g. Thalami optici. h. Corpora striata.

*special* and nerves of *general* sensation. Compared with the lower animals, especially with those belonging to the carnivorous species, the sense of smell in man is feeble. The sensation

of smell is especially connected with the pleasures and necessities of the animal life.

### TASTE.

The sense of taste is directly connected with the preservation and nutrition of the body. A delicious flavor produces a desire to eat a savory substance. Some writers on hygiene have given this sense an instinctive character, by assuming that all articles having an agreeable taste are suitable for diet. The nerves of taste are distributed over the surface of the tongue and palate, and their minute extremities terminate in well developed *papillæ*. These *papillæ* are divided into three classes, termed, from their microscopic appearance, *filiform*, *fungiform* and *circumvallate*. The organ of taste is the mucous membrane which covers the back part of the tongue and the palate. The *papillæ* of the tongue are large and distinct, and covered with separate coats of epithelium. The *filiform* *papillæ* are generally long and pointed and are found over the entire surface of the tongue. The *fungiform* are longer, small at the base and broad at the end. The *circumvallate* are shaped like an inverted V and are found only near the root of the tongue; the largest of this class of *papillæ* have other very small *papillæ* upon their surfaces. It is now pretty satisfactorily established that the *circumvallate*, or *fungiform* *papillæ* are the only ones concerned in the special sense of taste.

The conditions necessary to taste are, that the substance be in solution either by artificial means, or by the action of the saliva; and that it be brought in contact with the sensitive filaments imbedded in the mucous membrane. The nerves of taste are both *general* and *special* in their functions. If the general sensibility of the nerves of taste is unduly excited, the function of sensibility is lost for some time. If a peppermint lozenge is taken into the mouth, it strongly excites the general sensibilities of taste, and the power of distinguishing between special flavors is lost for a few moments. A nauseous drug may then be swallowed without experiencing any disagreeable taste.

Paralysis of the facial nerve often produces a marked effect in the sensibility of the tongue. Where this influence lies has not been fully explained; probably it is indirect, being produced by some alteration in the vascularity of the parts or a diminution of the salivary secretions

### TOUCH.

By the sense of touch, we mean the *general sensibility of the skin*. Sensations of heat and cold are familiar illustrations of this faculty. By the sense of touch, we obtain a knowledge of certain qualities of a body, such as form, consistency, roughness, or smoothness of surface, etc. The tip of the tongue possesses the most acute sensibility of any portion of the body, and next in order are the tips of the fingers. The hands are the principal organs of tactile sensation. The nerves of general sensibility are distributed to every part of the cutaneous tissue. The contact of a foreign body with the back, will produce a similar *tactile* sensation, as with the tips of the fingers. The sensation, however, will differ in *degree* because the back is supplied with a much smaller number of sensitive filaments; in *quality* it is the same.

## CHAPTER XXV

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# THE BRAIN AND MIND.

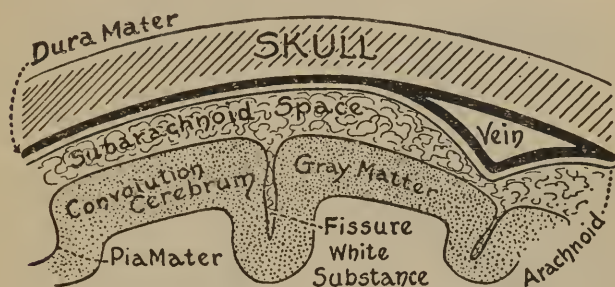
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This chapter must necessarily commence with an attempt to determine with as much precision as possible what is meant by the word "mind."

To begin with, mind, viewed in a scientific sense as a natural force, cannot be observed, handled, or dealt with as a palpable object. Like electricity, or gravity, or any of the other natural forces, it is appreciable only in the changes of matter, which constitute evidence of its existence. Each display of mental power is accompanied by some change in some part of the nervous elements of the brain. In other words, every action of the mind is the result of some alteration, physical or chemical, in that complicated mechanism which guides human intelligence. Mental power is an organized result, not, strictly speaking, built up, but matured and developed by slow degrees during life. The brain is not, like the liver, heart and other internal organs, capable from the moment of birth of all the functions which it ever discharges; for while in common with them, it has certain duties for the exercise of which it is especially intended, its high character in man, as the organ of conscious life, the supreme instrument of his relations with the rest of nature, is developed only by a long and patient training. Its functions are completed in the individual, as they have been built up in the race, by the gradual effects of experience. If we are inclined to feel surprise that so great a result can be brought about in the individual in so short a time, we shall do well to reflect upon—first, the rich inheritance of other men's labor, the vast experiments in the laboratory of nature

through which his brain has passed; and, secondly, the great amount of human work and energy which is concentrated in what we call education—that is, in the methods and appliances which are used in the training of every normal child. These numerous methods and appliances, simple as they may seem, represent the ultimate acquisition of very many years of human struggle. Even the language which is taught embodies the gains of countless ages of progressive adjustment of the human

*Fig. 66.*



SECTION OF HEAD FROM FRONT.

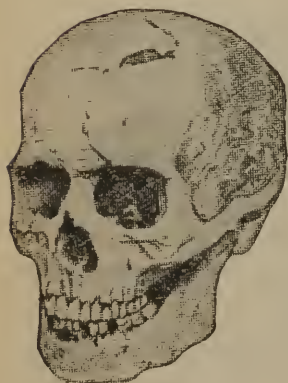
Beneath the skull and above the brain are three membranes and a space. They are the dura mater, next the arachnoid membrane, then the space called subarachnoid, then the membranous pia mater. The subarachnoid space contains a liquid, known as cerebro-spinal fluid.

organism to its environment. Though the brain, then, is formed prior to birth, its highest development only takes place after birth; and the same gradual progress which is exhibited in the growth of the organ is also witnessed in the increase of our intelligence.

It must, however, be distinctly understood, that mental action is as surely dependent on the nervous structure and its adequate supply of suitable blood as the action of the liver is on its structure and its blood supply. That is the fundamental principle upon which the mental science of to-day rests. The nerve-cells which form so great a part of the delicate structure of the brain are undoubtedly the centers of its activity. We know, as the result of experiments, that the nerve-cells scattered through the tissues of organs, as for example through the walls of the intestines and the structure of the heart, are

centers of nerve force aiding in their action; and we may confidently infer that the cells of the brain, or at any rate some of

*Fig. 67.*



A



B

THE FAMOUS CROWBAR CASE.

Introduced to show how a large portion of the brain may be destroyed, provided it is not a vital centre, without materially affecting the intelligence or the health.

The comparative size of the crowbar and the skull is shown.

The crowbar was shot upward through the patient's eye and skull, coming out through the top of the head, behind the forehead.

See Fig. B. Fig. A shows point of exit.

them, which are not amenable to observation and experiment, have similar action or function.

Certain compounds found in organic substances, and known as extractives, testify to change as a consequence of use (functional activity) of the brain, and associated with their use are various acids similar to those existing in muscle after its activity. In the performance of an idea, as in the performance of a movement, there is what may be called a step backward on the part of that portion of the body which is employed. Expressed in scientific language which is much more exact than the words just used, there is a "retrograde meta-

morphosis of organic element." The display of energy is at the expense of highly organized parts of the body, and these undergo degeneration; and the final products are, so far as is known, somewhat similar in muscle and nerve. Without the

burning-up process, known as oxidation, which produces force and energy, we can no more have thought from brain than we can have flame from fuel.

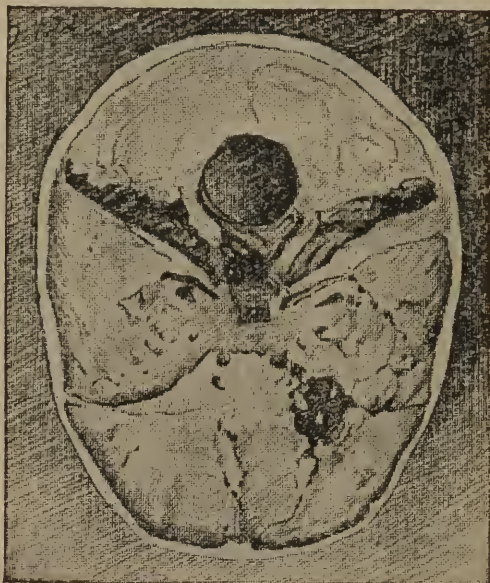
While the contents of nerves are neither acid nor alkaline, but neutral during rest in the living state, they become acid after death, and after great activity during life. The same condition exists in regard to muscle. Further, after prolonged, mental exercise, the products of the disintegration of nerve element, into the composition of which phosphorus enters largely, may sometimes be recognized by an increase of phosphates in the urine. It is only by supposing thought to be accompanied by change in the nerve-cells that we can explain the exhaustion following excessive mental work, and the breaking down of the brain in very extreme cases.

The locomotive is a complicated mechanism, of the construction and mode of action of which many people know very little, but it performs very definite duties, and those who know almost nothing of its construction, have nevertheless, a clear idea of what it accomplishes. The action of the locomotive as a whole is very different from the action of any part of it. But the working of the locomotive is dependent on the mechanism, and on the combined action of all parts, as well as on the supply of suitable fuel, and cannot be separated from these. Indeed, although the working, or function, of the locomotive may exist as a conception of our minds, it has no real existence aside from the various parts of the mechanism and the coal or other fuel. By observation of the working parts of a locomotive, aided by a certain amount of reasoning, we get the essential idea of what constitutes the machine to which the name locomotive has been applied. The process referred to gives us, in fact, a fundamental impression of the detailed principles of its possible uses as a piece of machinery.

Very much the same condition exists in regard to the numerous phenomena of mind. By observation of them, and by adding together the facts which we have learned, we arrive at a general conception or essential idea of what is meant by the word "mind." Because we can form this general conception of mind, it does not follow that mind can exist apart from the complex organization of the brain and its suitable blood supply; there is no scientific justification for such a

conclusion. In consequence, however, of the powerful tendency on the part of the human intellect to make the reality conform to the idea, the general conception of mind has been converted into a distinct entity, and has been allowed to create a wrong

*Fig. 68.*



*C*

CROWBAR CASE.

Figure *C* is a photograph taken of the portion of skull upon which the brain rests. The ragged rent just over and behind the bony socket of the eye is shown. The patient made a good recovery and lived for years—with no noticeable change in a moderate mentality.

impression. Whatever may be the real character of mind—and concerning that it is as useless to speculate as concerning the real nature of electricity or gravitation—it is unquestionably dependent for its manifestations upon the brain and the nervous system.

The component parts of the brain are not inexhaustible centers of self-creating force; they give out no more than what they have in one way or another taken in; they receive

material from the blood, and make it of the same kind as themselves — that is, they assimilate it. A transformation of energy necessarily goes along with this upward alteration of matter.

In mental science, certain propositions may be regarded as established beyond any reasonable doubt. There are at least five of them. Disregarding all technical terms, as is desirable in an article of this kind, they may be described in the following words: When a thought occurs in the mind, there necessarily occurs a change in the so-called grey matter of the brain, that grey matter being the part of the brain which is responsible for mental activity. Without that change, the thought could not arise, and with it a thought cannot fail to arise. The change referred to consists of a movement of some kind, which, with our present imperfect knowledge cannot be defined. The nearest resemblance to it is probably found in the compounds of vibrations in music. At any rate this analogy, defective as it may be, will help us to get a general idea of what takes place. The movements referred to have sometimes been called material ideas. (These have been divided into *object-presentative* and *representative* according as they are excited from without or from within. They are determined in direction by the established nerve-paths — the fibers and the connections of cells. This is somewhat technical, but as it forms an explanation of what has preceded it cannot be omitted). The movement referred to above takes time, sometimes longer, sometimes shorter, but is always an appreciable period. It requires a regular supply of suitably constituted blood. It is arrested or prevented by an interruption of the continuity of nerve, or by slight modifications of its structure, as by pressure, or by compression of the brain. The movements are interfered with and finally stopped by the exhaustion produced by frequent or prolonged exercise without the necessary intervals of rest.

The reader should now have a fairly accurate idea of what is meant by the word "mind." In the lowest forms of animal life, nerve does not exist: the most simple beings known as protozoa are, so far as can be ascertained, destitute of any trace of nervous system. They consist of an apparently uniform substance, identical in all its parts, that is homogeneous, and all functions are carried out without special organs. These

minute animals are nourished without a special digestive system; they breathe without lungs or any substitute for lungs; they feel and move without organs of sense, without muscles, without nervous system. The stimulus (exciting action) which the little creature receives from without produces some change in the relations of the component parts of its body, and these imperceptible movements seem to amount collectively to the perceptible movement which it makes. But it must be understood that even the simplest creatures which do not appear to have any indication of the elements of a nervous system do not move in a vague, confused and indefinite manner. They present indications of adaption to functional ends; they show, in fact, the fundamental property of living matter, namely, motion in direct response to impression.

With differentiation of tissue and increasing complexity of organization which are met with as we ascend in the animal kingdom, the nervous tissue appears, but at first in a very simple form. The simplest type is represented by two fibers which are connected by two nerve-cells; these fibers appear to be simple conductors, and may be roughly compared to the conducting wires of a telegraph apparatus, while the cell (*d*) being the center in which nerve-force is generated, may be compared to the apparatus itself. This type of structure is repeated throughout the complex nervous systems of all the higher animals—the fibers with their junction cells form units from the multiplication and complex arrangement of which the most intricate nervous

*Fig. 69.*



Division of a nerve, showing a portion of a nervous trunk (*a*) and separation of its filaments (*b*, *c*, *d*, *e*.)

structures are built up. Owing to the different kinds of tissue and to the specialization of organs in the more complex animals, there cannot be that intimate connection between all parts which there is in the homogenous (consisting of similar material) substance of the simplest form of animal life. The easy motion, as from particle to particle, not unlike an infection, where the substance is of the same kind, cannot take place in a heterogeneous body, that is, where the essential elements are unlike. Accordingly, special provision is required for insuring communication between different parts, and for

harmonizing the activity of different organs. The animal must be made capable of associating a number of distinct actions for definite ends. This function, necessitated by physiological division of labor, is aided by the nervous system; and we might compare it to that which a gifted popular teacher fulfils in everyday life. He grasps the details of the various

*Fig. 70.*



VIEW OF THE BRAIN

Showing where the two halves lie against each other to show centres of vision and that presiding over the leg.

investigations which a necessary division of labor enforces, and elaborates a result in which the different lines of thought are put together, and a unity of action is marked out for future progress. The nervous system effects the building-up process (synthesis) which the specialization of living instruments in the analysis of nature makes essential. To this function the nervous system is well adapted, first, by the extent of its distribution, and, secondly, by its extreme sensitiveness by which an impression made at one point is very quickly felt at a distance from the place where it was made.

With augmented complexity of organization which marks

the increasing adaption of living structures to external nature, or, in other words, which marks an ascent in the scale of animal life, there is a progressive complication of the nervous system: specific developments providing for special purposes take place. With the appearance of the organs of the various senses, as we advance in the scale of animal life, there is a corresponding increase in the aggregations of nerve centers, known as ganglions, which, being clustered together, form the primitive rudiments of a brain.

It is not known with any degree of certainty when the different organs of the special senses make their first appearance; they are at first of a very simple character, and are clearly modifications from the most general sense of all animals, that of touch. The skin is an organ of sense which extends over the outside of the body, and perceives by actual contact with the objects that affect it; the other senses may be nothing more than different forms, what in technical language would be called differentiated involutions, in which complicated cuticular (skin-like) structures, placed more or less within

*Fig. 71.*



the body, perceive without actual contact. However this may be, touch must be considered the fundamental sense, that which is the mother of knowledge. In some of the lower creatures the organs of hearing, smell and taste are undoubtedly modifications of certain portions of the covering of the body, and even the organ of sight, when it appears in its earliest and simplest form, is nothing more than the termination of a nerve, surrounded by a few specks of color in a fold or recess of the skin. Even in

amphioxus, the lowest form of life possessing a backbone—a small marine animal of worm-like appearance—the only vestiges of eyes are a couple of pigment spots, the organ of smell is a cup-shaped depression in the fore end of the body, and, to the best of the writer's knowledge, no organ of hearing

has ever been discovered. As we ascend in the animal world, structures adapted to the reception of particular impressions, as of light, sound and touch, become more special, and make the higher animal capable of more numerous, and complex relations with external nature.

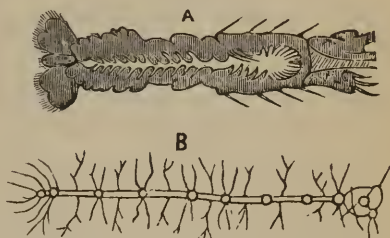
Not until we arrive at the fishes do we discover anything more of the character of a true brain. Below the fishes there is no trace of cerebral hemispheres—two large semi-egg-shaped masses forming the cerebrum. The cerebrum is the upper and anterior portion of the brain, the cerebellum being the part below and behind the cerebrum.

It is evident, then, that cerebral hemispheres are not essential to sensation, or to the reaction to sensation, for they are entirely absent where both these functions are displayed in a lively and vigorous manner.

Ought we to attribute consciousness at all to the sensibility or susceptibility of creatures which have no nervous system? An impression upon one of them certainly produces a definite effect which results in a definite movement, either to avoid the consequence of the impression, if injurious, or to embrace it, if profitable; but is there any justification for asserting that consciousness has any part in these events? The phenomena of our own lives point in the opposite direction. For example, a man in good health is not conscious of the possession of a liver, yet that organ sometimes produces a marked effect upon his mental condition if he eats more food than he can easily digest. If we attribute consciousness to the sensibility of the lowest nerveless animals, can we deny it to certain non-living things—to sulphuric acid, for instance, which, chemists tell us, has such a decided affinity for barium that it displaces nitric acid from its combination with that metal?

In fishes the rudiments of cerebral hemispheres are repre-

*Fig. 72.*



A. Nervous system of a Crab, showing its ganglia. B. The nervous system of a Caterpillar

sented by a thin layer or projection of nerve material; in the amphibia (animals which can live both in water and on land) this layer is somewhat larger than in fish; in birds it is still further increased; in mammals (creatures which suckle their young), the hemispheres of the brain are comparatively large, and as we ascend in the animal world, we find that they gradually extend backward until, in man and in some of the higher apes, they entirely cover the cerebellum.

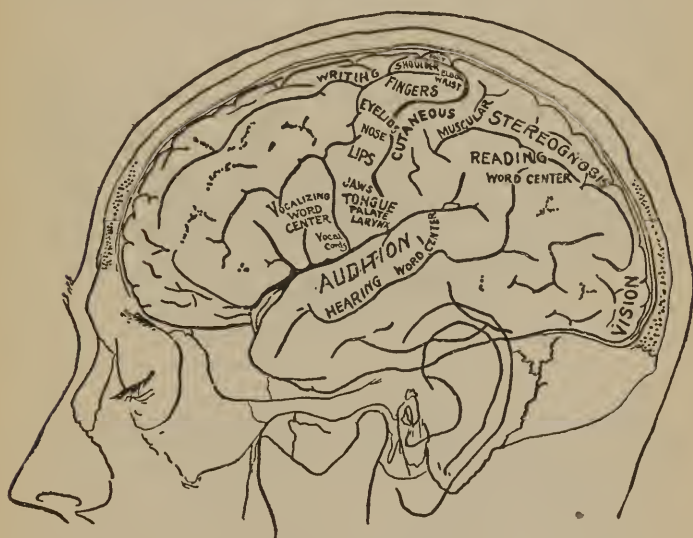
In fish we come upon the first distinct appearance of simple ideas, and of the lowest beginnings of emotion. Some fish, such as carp, will collect to be fed at the sound of a bell, a fact which gives evidence of the association of two simple ideas; and some sharks, suspicions of danger, will avoid a baited hook. In birds, in accord with the increased development of the hemispheres, the manifestations of intelligence are much greater. The tricks which some of them can be taught are remarkable, and those who teach them have often described how different birds differ in intelligence and in temper. Some people look upon such performance as marvelous, because they have a fixed idea that all manifestations of intelligence in animals below ourselves in the scale of life are surprising. If we keep in mind the fundamental plastic property of nerve element by which it receives impressions and grows to its methods of exercise, we may not feel so much surprise, and we may have reason to think that some animals might be made capable of much greater display of intelligence if we selected for breeding purposes only those which show intelligence above the average, and educated these in a rational manner. Simple emotional exhibitions are observable among birds. Indeed, at times the feeling of rivalry or jealousy among canaries is very evident, and some writers on birds mention instances in which an orphan bird has owed its life to the care of birds of a different species.

In mammals a gradual advance of intelligence may be traced from very humble manifestations up to those higher forms of brute reason which differ only in degree from the lowest forms of human intelligence. Consider how deeply meditative the elephant sometimes shows itself; how well versed in cunning schemes the monkey is; how plainly in the dog an inhibitory (restraining) conception often intervenes

between the sensation and the usual respondent movement, so that the animal refrains from doing what it has a strong impulse to do, the impression having been passed on to the hemispheres and their controlling action brought into play.

As we ascend through the mammals, we find that not only do the hemispheres increase in size by gradually extending backward, but the grey surface of them is further increased

*Fig. 73.*



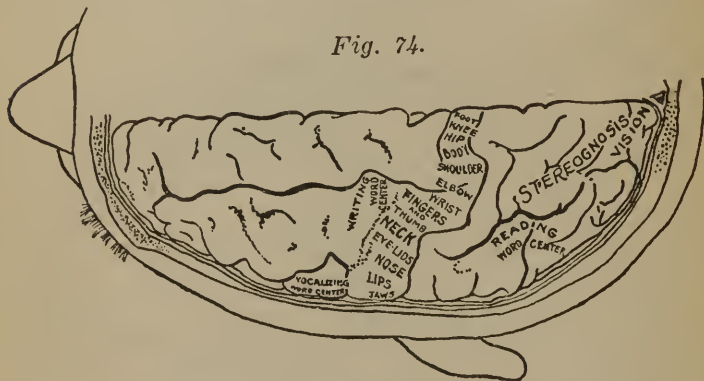
LEFT HALF OF THE BRAIN.

Showing centres of gray cells massed in localities and presiding over special functions.

by being thrown into folds known as convolutions. While some mammals are entirely destitute of such convolutions, these are present, as a rule, in the ruminating animals (those which remasticate their food), and in the carnivora (animals which live on flesh). They are much more developed in the marine mammals, such as the whale, which is a true mammal and not a fish. They are, of course, most fully developed in the apes and in man. It is quite true that, at present, science does not enable us to put forward an exact relation between the develop-

ment of the convolutions and the degree of intelligence in different animals, for the brains of the ass, cow and sheep, beasts that show comparatively little intelligence, are more convoluted than are those of the cat and dog, which certainly display considerable intelligence. But the relative size of the animals must be taken into account in such comparison. The volume of a body, such as the brain, which increases in size with the size of the particular animal which is being examined,

*Fig. 74.*



LOCALIZATION CENTRES.

One-half of the brain viewed from above. Certain portions are indicated to show the centres which contain collections of cells that have definite control of certain functions, members of the body, muscular action or sensation.

In local disease of the brain, affection of these functions points to the locality of the diseased process.

increases in greater proportion than the surface, and the latter in greater proportion than the diameter. In each order of mammals, the head, but especially the capacity of the skull, bears a certain ratio to the body, a ratio which remains fairly constant in different species. The head of the lion or tiger has about the same proportion to the body as that of the cat's head to its body, although the body weights of the animals are very different. It follows then that, as the volume of the brain of the tiger in relation to the size of the body is about the same as in the cat, and as the larger the brain the smaller the relative surface, the surface of the brain is proportionately greater in the cat; and that, consequently, in order to get a proportionate extent of grey surface in the tiger, this must be

convoluted in that animal, when it may remain nearly smooth in the smaller animal. If in two animals of equal size, and of similar form of structure, the convolutions are differently fashioned, then it may be correctly asserted that one will be more intelligent than the other in proportion as its convolutions are more numerous and complicated and the sulci (grooves) deeper. Comparing the brains of different breeds of dogs or of varieties of anthropoid (manlike) apes, it is practically certain that the more intelligent breeds and varieties have larger and more convoluted hemispheres, always provided that other matters, such as, with dogs, selective breeding with a view to intelligence, are equal.

The same proposition—that the more intelligent races of men have larger and more convoluted brains—is true. The Bosjesmans are a South African people, very short in stature, with skin a dirty yellow in color. Their brains have often been described, the first and most elaborate examination of the brain hemispheres of one of them having been made by the celebrated French anatomist, Louis Pierre Gratiolet, more than forty years ago. What is most striking in the Bosjesman's brain is the simplicity and regular arrangement of the convolutions of the frontal lobe; they always present an almost perfect symmetry in the two hemispheres, such as is not found in the normal brains of white men. This symmetry, when seen by an experienced anatomist, involuntarily recalls the regularity and symmetry of the cerebral convolutions of the lower animals. Gratiolet's opinion was that the brain of a Bosjesman could be compared only with that of a white person who was idiotic from arrest of cerebral development. Further, the differences between it and the normal Caucasian (white man's) brain are unquestionably of the same kind as those which exist between the ape's brain and that of man. They are, of course, much less in

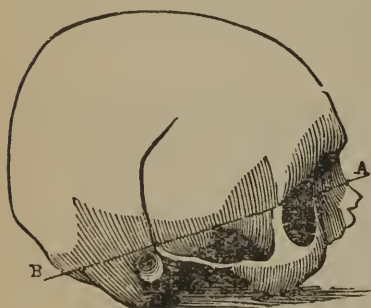
*Fig. 75.*



Skull of murderer Lopez.

degree. The Bosjesman (or Bushman) brain shows marked evidence of structural inferiority; the primary convolutions, though all present, are smaller than in the average Frenchman, and are much less complicated; the external connecting convolutions are still more remarkably defective. In size and in all signs of comparative inferiority, the hemispheres of the South African Bosjesman's brain resemble

*Fig. 76.*



Skull of Feeble Invalid.

those of the highest apes, or those of an abnormal (idiotic) white man. The brain of the negro is superior to that of the people mentioned above, but it does not reach the level of the white man's brain, even in average weight, which, in Americans is said to be 52 oz., while in Europeans it is given as 49½ oz. These weights are those of male brains. The average female brain weighs about five ounces less, probably be-

cause the body weight of the average woman is less than that of an average man. The negro brain somewhat resembles that of the orang-outang in narrowness of the hemispheres in front and greater symmetry of the convolutions.

Among white men it has been found that, other circumstances being alike, the size of the brain bears a general relation to the mental power of the individual, although apparent exceptions to this rule no doubt occur. It is said that the brains of some men distinguished for mental capacity averaged more than 54 oz., but as the body weights of these men never appear, their average brain weight conveys little information. The brain of Cuvier, the celebrated French anatomist, is often quoted as 64 oz., which seems very heavy. Cuvier, however, may have been an exceptionally large man. In Buffalo, N. Y., there is a successful lawyer and ex-judge, whose usual body weight is very close to three hundred pounds. In the same city lives a prominent physician who for a number of years has had an extensive general practice, and whose body weight is

seldom more than one hundred and seventeen pounds. To compare the brain weights of these two gentlemen without taking their body weights into consideration would be unjustifiable. In fact, most comparisons of this character are fallacious, and should be avoided.

The brain is sometimes very small in idiots, and the parts are much less complex than in the normal individual, the convolutions being simple and poorly developed. The brains of some idiots resemble those of the baboon. There are brains of microcephalic idiots (those having unusually small skulls), which present a complete series of stages in a gradual descent from man to the anthropoid apes, which, of course, are not man's ancestors, but are his nearest relatives in the lower animal world, a fact which must be obvious to anybody who will compare the human skeleton with that of gibbon, chimpanzee, or gorilla.

As a general assertion, it is certainly true that we find evidence of a correspondence between the development of the cerebral hemispheres and of mental capacity when we examine the different races of men, just as we do when we investigate the intelligence of the animal world below man. But in making comparisons between the brains of men in the same state of civilization we must not forget that quality must be taken into account as well as quantity. The thickness of the grey matter of the brain is of importance, and, in addition, it is quite probable that the number of vibrations in the nerve-tracts of the hemispheres may in some instances convert a man with ordinary intellectual power, so far as size and weight of brain, and extent of grey matter are concerned, into a man of great ability. Evidence upon this point, is neither abundant nor satisfactory, yet it is true that some persons who have not been remarkable for mental capacity have been known to exhibit surprising sparks of intelligence at the beginning of an attack of acute insanity, and demented individuals have temporarily recovered their intelligence in an unexpected manner during the excitement caused by their high temperature while seriously sick.

Phrenology is the theory that the configuration of the skull corresponds closely with that of the brain, and that mental characteristics are recorded upon the outer surface of the skull.

Scalp charts showing thirty or forty areas are familiar to most people. Each area is supposed to be associated with a special faculty.

As a pretension to science, phrenology is related to physiological psychology as alchemy is to chemistry. Nevertheless, for a time it served a useful purpose in stimulating investigation of the functions of the brain. In the light of modern knowledge, however, its teaching has ceased to be of value. The mind is not a bundle of faculties; its component parts are determined by the contributions of its sense-organs to its structure rather than by the types of activity by which the psychological self seems to acquire knowledge; the grey matter of the surface of the brain is not mapped out into areas which correspond with "affective propensities," such as spirituality, amateness, etc.; the skull does not accurately represent the contour of the brain surface, for the thickness of the former varies in different persons and in different localities in the same person; prominences on the surface of the skull do not necessarily indicate greater size in the part of the brain beneath; a considerable part of the grey matter of the brain—at least one-half—is concealed in the grooves (sulci); loss of portions of the brain by accident or disease destroys or injures the motor functions connected with some sense department, not some faculty; finally, the whole structure of phrenology falls as a result of investigation of the cortex of the brain by electrical stimulation, anthropoid apes being used for the experiments. The centers for movements of one side of the body are on the opposite side of the brain. The right hand, for example, is guided by the left hemisphere. Areas of the grey brain covering necessary for voluntary movement have been mapped out for certain muscle groups, such as those for the head, arm, eyes, leg, etc.

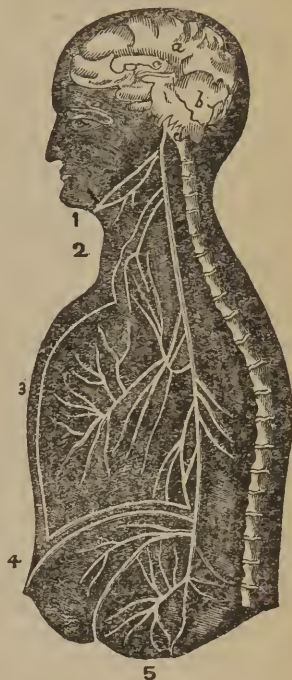
As in the many productions of her creative art nature has made no violent leap, but has passed in gentle gradations from one species to another, and from the highest animal to the lowest man, it is not surprising that the embryonic development of man (that which occurs before birth), should present indications of the general plan. There is no doubt that man in the course of his development passes through stages closely resembling those through which other vertebrate (back-boned)

animals pass, and that these transitory conditions in him are not unlike the forms that are permanent in the lower animals. In a few words, man in the course of his life history (technically called ontogeny), is a recapitulation of the history of the race (technically known by the word phylogeny).

There is a very close resemblance between the human ovum and some of the very low forms of animal life (sporozoa). In both an outer membrane contains a soft, semi-fluid substance, at one end of which is a delicate vesicle enclosing a solid particle or spot. In the earliest stages, no investigator has yet succeeded in distinguishing the human ovum from that of a quadruped (any animal with four feet). Even when examined with the highest microscopic power and the greatest care, no man can tell whether it will develop into a second Shakespeare or into a dog. As it proceeds to its destined end, it passes through stages similar to those through which other vertebrate embryos pass. (Embryo is the germ or rudimentary form of an animal or plant).

That which is true of the whole body is true also of the development of the brain. The brain of the human embryo at about the sixth week after fertilization may be described in general terms as consisting of a series of vesicles (sacs), the foremost of which, a double one, representing the cerebellum, is the smallest, and the hindmost, representing the cerebellum, is the largest. In front of the latter is the vesicle of

Fig. 77.



THE CRANIAL NERVES.

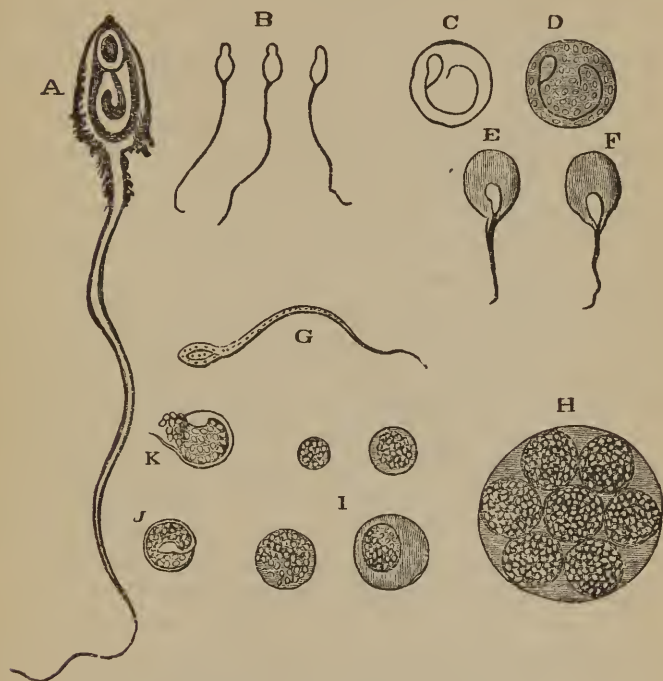
Section of the brain and an ideal view of the pneumogastric nerve on one side, with its branches. *a.* Vertical section of the cerebrum. *b.* Section of the cerebellum. *c.* Corpus callosum. *d.* Lower section of medulla oblongata. Above *d.*, origin of the pneumogastric nerve. 1. Pharyngeal branch. 2. Superior laryngeal. 3. Branches to the lungs. 4. Branches to the liver. 5. Branches to the stomach.

the part of the brain called in man corpora quadrigemina (two pairs of elevations situated under the bands which unite the hemispheres); in front of this vesicle is the third ventricle. More detailed explanation is not practicable without the use of technical language, but it may be said that at this stage the human brain resembles the fully-formed brain of a fish in the small proportion which the cerebral hemispheres bear to other parts, in the absence of convolutions, and in the general simplicity of structure. Later, about the twelfth week of embryonic life, there is a general resemblance to the brain of a bird—the cerebral hemispheres are much increased in size and arch backward, yet there are no convolutions, and the commissures (points of union) are defective. Up to this time, the cerebral hemispheres represent nothing more than the rudiments of the anterior lobes; they do not even pass the grade of development which is permanent in marsupial animals (those which carry their young in a pouch, such as the opossum). During the fourth and the early part of the fifth months, the middle lobes grow backward and cover the corpora quadrigemina; later the posterior lobes cover and overlap the cerebellum. Notwithstanding the assertion which appears in some works on brain anatomy, it has been proved beyond doubt that the posterior lobes exist in the anthropoid apes, and that in some of them they extend as far back as they do in man. It is easy to understand, then, that an arrest of development of the human brain at one stage or another of its growth may leave it very much in the condition of the brain of one of the lower animals; and, as a matter of fact, examination after death of the brains of some persons who were idiotic at birth has shown that these organs were very similar to those of the higher apes.

We find exhibited in the working of the human body all the different modes or kinds of nervous function which are met with in the lower animal world. The so-called irritability of tissue, by which it reacts to a stimulus without the aid of a nervous system, may be of the same character as that molecular energy of matter which is displayed by the movements of the simplest forms of animal life. Even in somewhat higher animals, whether a nerve ends outside the covering of muscular fiber (sarcolemma) or within it, there can be no doubt that

it is not distributed to every particle of tissue. In the vertebrate animals, however, after death, when all nervous influence

*Fig. 79.*



- A. Human Spermatozoön magnified about 3,800 diameters.
- B. Vertical and lateral views of spermatozoa of man.
- C, D, E, F. Development of spermatozoa within the vesicles of evolution.
- G. Cell of the sponge resembling a spermatozoön.
- H. Vesicles of evolution from the seminal fluid of the dog in the parent cell.
- I. Single vesicles of different sizes.
- J. Human Spermatozoön forming in its cell.
- K. Rupture of the cell and escape of the spermatozoön.

is necessarily withdrawn, an energy still exists sufficient to produce the marked inflexibility of muscles known as rigor mortis.

The simplest mode of nervous action in man, comparable with that of the lowest animals which possess nerve, is shown

by the scattered ganglionic cells belonging to the sympathetic nervous system which are concerned in certain vital processes. The heart's action, for instance, is attributable to the ganglionic cells scattered throughout its substance. The separate elements of tissue are co-ordinated (made to act in harmony) by the ganglionic nerve-cells of the sympathetic system, and these co-ordinating nerve-cells are known to be under cerebro-spinal control, that is they are controlled by the cerebrum and the spinal column. In the last-named structure the ganglionic nerve-cells are collected, and are so united that groups of them become independent centers of combined movements, simultaneous and in sequence, in answer to stimuli. This arrangement represents the entire nervous system of those animals in which no organs of special sense have yet appeared. Still higher in the scale of the nervous system, the sensory ganglia, consisting of multitudes of cells differentiated by their special connections, are clustered together, forming a very important part of the brain of man, while in some animals they constitute the whole of the brain. In the cerebral hemispheres there is still greater specialization and complication of structure with corresponding enlargement of function; and, in conformity with its highest degree in man, there are in him the most complex manifestations of mental processes. In man, then, is summed up the animal kingdom; he actually presents us with a sort of analysis of it, for in the working of his body we find an integration and harmonious co-ordination of different vital actions which are separately displayed by subordinate members of the animal world.

If we attempt to trace the manner in which function takes place in the human brain, we become lost in the intricate and complicated mechanism of cerebral cells and fibers, but we can realize how sufficient, or more than sufficient for all the variety of our mental processes is the multitude of cells and most delicate fibers which constitute the convolutions. It is certain that in one cubic inch of convolution there would be found, if they could be counted, several hundred thousand nerve-cells, and in all the convolutions cells more in number than all the

stars of the heavens. When we compare these numbers with the number of words made use of by the most accomplished writers of English, we may perhaps be tempted to think that only a small portion of our intellectual instruments are utilized. Out of a possible number of English words, amounting to four hundred thousand\*, Shakespeare uses about fifteen thousand, Milton not over eight thousand, an ignorant or uneducated person certainly not over three hundred.

Although there are observable differences in the size and configuration (structural arrangement) of the cells of the cortex (outer layer) of the hemispheres of the brain, yet it is clear that we cannot at present penetrate these intimate special differences in constitution or composition, or trace those special connections which the variety of their functions indicates. These essential differences of constitution are not of such a character that they can be revealed with existing microscopic power. Moreover, it is possible that they depend on chemical composition, and in that event, there is no certainty that microscopic power will ever aid us in penetrating into the molecular constitution of nerve element, even if we could isolate special cells as required.

Those of us who may be disposed to think it impossible that such important constitutional differences should exist in so small a compass, would do well to remember the numerous undetectable conditions which are positively known to exist in the most minute organic matter, as, for example, in the delicate spermatozoön (the fertilizing element of the male sex). It is from the union of this minute speck with a germinal vesicle that the muscles, nerves and brain, the intellectual organs of a Cicero or Columbus, are produced. The single sperm-cell, (spermatozoön) embodying the qualities of generations of male and female ancestors, unites with the germ-cell (ovum) embodying in like manner the qualities of generations of male and female forefathers, and gives birth to a new organic

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\* Number of words in latest edition of Webster's Dictionary. Not number of words existing in Shakespeare's time.

product which, minute as it is, contains in latent form all the essential characteristics, and in due course displays many of the qualities of ancestors on both sides, in addition to exhibiting new qualities as a result of the organic combination. There is, when this matter is considered, nothing extravagant in the supposition that a single nerve-cell may contain similar possibilities. Another example is the infinite smallness of the odorous particles which affect the smell, and, more wonderful still, the marvelous discriminating susceptibility of sense to these undetected agents. The extreme minuteness and consummate delicacy of the operations taking place in the most intimate recesses of nature are even more striking and wonderful than the vastness and grandeur with which the astronomer is concerned. Indeed, an atom of pure iron may involve a more complicated system than that of the planets and their satellites. Of what may happen in a world into which human senses have not yet found means of entrance we are no better able to speak than a man who was born blind is able to talk of the appearance of objects. In such matters it is a much wiser plan to say "I am willing to believe some things which seem impossible" than to assert that certain things are impossible because, with our present knowledge of physiology, chemistry, and biology, they appear inconceivable.

## CHAPTER XXVI

# Old Age Deferred

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“The past few years have witnessed marvelous discoveries and inventions. Consider the X-ray that makes solid bodies transparent; the wireless telegraph whose messages traverse space for thousands of miles; also the **High-frequency Current**, whose application to the human body has, with other discoveries, well nigh revolutionized the healing art, resulting in the control and the relief of miseries formerly regarded as beyond hope. The High-frequency apparatus, in simple terms, is one in which the patient sits or lies within a coil or large spiral of wires, which are so charged with an electrical current that the individual within the spiral is receiving a continual bombardment of electricity from all directions; while this penetrates every tissue of the body it is entirely beyond the perception of the senses. The patient feels reposeful and quiet during and after the treatment. \*

“The electric lamp held in the hand will glow with light, showing the steady influence of an electric discharge. The small blood-vessels of the body relax; the extremities and skin, usually cold, become warm, and, in some cases, slightly moist from increased perspiration. The current stimulates and increases the activity of all cells of the body. If the brain and mental powers are excited they become soothed; this calming effect produces healthy sleep; patients who have been unable to rest quietly sleep without any sleeping medicine, even though they have become accustomed to its use.

“With increasing years most people find digestive processes less active; they have indigestion after eating foods that in earlier life were readily taken care of by the stomach and intestines, vertigo or dizziness on sudden change of posture and shortness of breath on exertion, as climbing stairs or walk-

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\* Read at a recent meeting of a State Medical Society by one of our physicians, who has directed the Electrical treatment at the Invalids' Hotel and Surgical Institute, Buffalo, N. Y.

ing rapidly. These, with stiffness of the joints, poor circulation and dullness of the senses, indicate a gradual tendency to the failure of all the vital processes, which is likely to come with old age.

"The High-frequency treatment, if persisted in, gives relief and gradually overcomes the tendency to decay of the vital forces. Patients of seventy years of age, after a course of treatment, express themselves as feeling from ten to twenty years younger than when they began the treatment, and their general appearance certainly bears out the truth of their statements. The languid lose their apathy and feel able and active; the bilious obtain relief; the sluggish liver and bowels take on their normal activity and the result is improved vigor and general tone.

"The treatment has to be skilfully administered with strict attention to the individual's strength. The elimination of poisons that should be carried off through the various excretory organs is greatly increased. If the organs are weak or over-worked it is necessary to measure up their abilities by the usual physical tests known to the skilful physician, and to administer, at first, a mild dosage of High-frequency that will tend to increase the activity of the cells of the organs whose duty it is to carry away poisonous matter; as these cells gain in strength, the dose is increased until a reasonably full activity of the vital powers is obtained.

"The treatment has received the most enthusiastic approval of all who have given it a trial. Scores of individuals who have felt the gradual waning of their physical strength and mental and nervous energies have, by both word and action, shown the great benefit that they have received from this delightful form of rejuvenation."

The following cases are selected as showing the wide range of improvement that results from the use of this well nigh marvelous method of treatment:

**CASE 1.**—A man at the age of seventy-three years was forced to quit sedentary employment with one of the largest corporations of which he had been a most faithful employee for half a century. He was completely broken down in health and spirit, eye-sight and hearing poor, condition feeble, complained of intense heart pains in the chest on walking more than a

few rods, bilious spells, head swimming, weakness and loss of appetite.

Dosage of High-frequency daily, intervals of application five minutes, gradually increased to ten. At the end of two months' treatment reports the most satisfactory benefit. Walks to and from his home for treatment, a distance of two miles, without the slightest pain or discomfort. The attacks of neuralgia of the heart and stomach have disappeared, the mental depression and lassitude disappeared after two weeks' treatment, while physical functions thought to have been entirely lost have gradually returned.

**CASE 2.**—A business and literary man of exceptionally high mentality gradually losing his health, beginning with an attack of gripe and resulting in an abscess in the head. During the extreme hot summer weather he suffered from heat-stroke that resulted in partial paralysis of the left arm and loss of memory and ability to speak or recall certain words. Associated with it he had attacks of mental depression and physical weakness.

With the use of the High-frequency this patient made a very rapid improvement although for months previous his condition had been at a stand still and hope of recovery had been abandoned. The paralysis and mental confusion steadily cleared up. He was able to walk, climb hills and even run with the agility of his earlier years. So pleased was he with the effects of the treatment and the restoration of the youthful vigor of mind and body that he had a machine built for his own personal use in his home at an expense of many hundreds of dollars.

**CASE 3.**—A highly educated woman, of sixty years of age, unable to exercise or pursue her previously active habits because of weakness, shortness of breath and lameness had gradually increased in weight until her flesh was a burden.

Under the High-frequency she lost superfluous flesh at the rate of a pound a week, with a steady improvement in her strength and health. After two months' treatment she discontinued, feeling perfectly well, but she occasionally uses High-frequency when for any reason she becomes debilitated.

**CASE 4.**—A writer of exceptional ability had practically given up work because of weakness, constipation, inactive liver and very weak circulation. Arterio-sclerosis had developed. Arteries could be felt as firm, whip-cord-like tubes of varying

sizes throughout the body. Had for years a chronic catarrhal cough, growing steadily more annoying, after which headaches were experienced. There was gradual loss of ability to concentrate the mind while at work. After three months' treatment, followed by an interval of two months, patient stated: "I feared that all the improvement and benefit I experienced would be only temporary, and that possibly after stopping the High-frequency treatment my old discomforts would return but I am happy to state that such is not the case. I feel myself renewed and improved in every way, and shall regard the High-frequency as having saved me from disaster and restored me to activity, health and usefulness."

A long list of similar cases could be cited from the substantial records of two years' experience at the Invalids' Hotel and Surgical Institute, Buffalo, N. Y., showing that while this treatment must be suited to each case, it is one of the most potent remedial agents for physical decay that modern science has evolved.

In *arterio-sclerosis* common to advanced age, the walls of the arteries degenerate and become impregnated with a deposit of calcium salts and other earthy deposits, making these vessels hard and inelastic. This causes impaired circulation of the blood. The arteries thus weakened by disease are strengthened by High-frequency currents which aid in the natural regeneration by the elements of the blood and lymph and by relaxing the capillary system, relieve undue blood pressure and thus promote a return to normal elasticity. If the treatments are persisted in for some time the calcium and other deposits apparently disappear. Without doubt the High-frequency current is by far the best and most lasting treatment yet devised for the relief of symptoms due to arterio-sclerosis.

# HIGH-FREQUENCY CURRENTS

*Their effects : Increase circulation and help to expel poisonous waste. Produce ozone and increase the quantity of oxygen in the blood.*

*Give better capacity for work and walking.*

*Lessen unhealthy fat.*

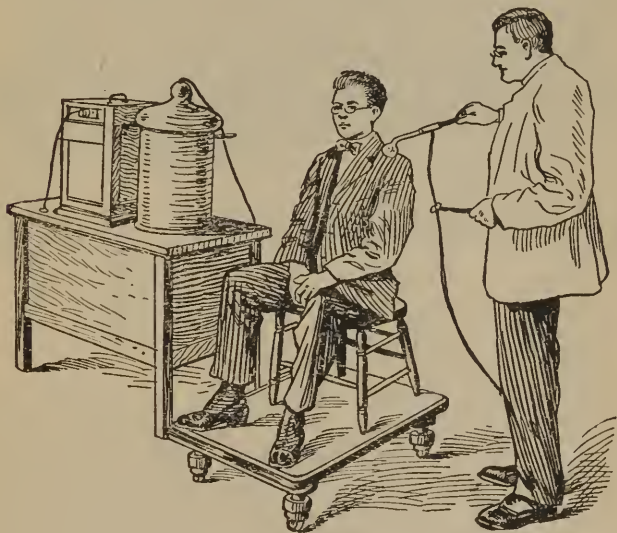
*Relieve asthma and chronic rheumatism.*

*Help intestinal action, relieving constipation.*

*Dizziness and headache in the aged disappear.*

*The best known agent for the relief of hardening of the arteries in the middle aged and elderly.]*

The wonderfully efficient High-frequency Oscillating Currents are obtained by passing the ordinary lighting current of low voltage or strength through a transformer, which produces a high voltage—often reaching hundreds of thousands of volts.



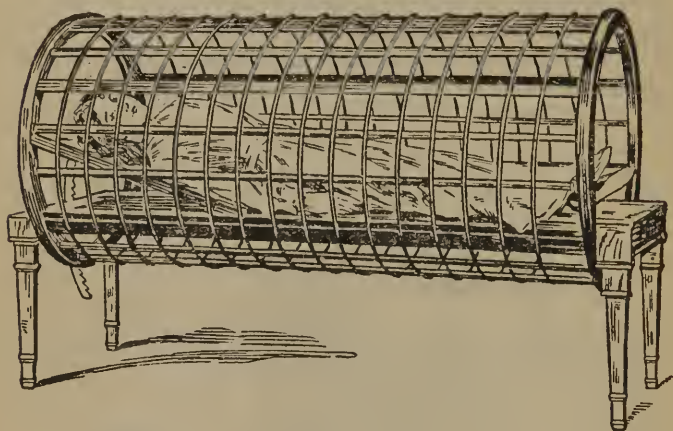
Generator High-frequency Current.

This, in turn, is passed through another arrangement by which the current is caused to oscillate; that is, it flows alternately, first in one direction, then in the other, often several million times a second.

The one characteristic of the High-frequency Oscillating Current is its lack of power to excite the motor or sensory

nerves aside from casting a slight sensation of warmth at the point where it comes in contact with the skin. The reason for this is that the nerves respond only to certain frequencies of stimulus. The motor nerves, for instance, will react to vibrations up to 10,000 a second, but if vibrations are increased above this point contractions of muscles diminish and finally cease altogether.

At the terminals of a working High-frequency apparatus



Cage for Auto-Induction Treatment.

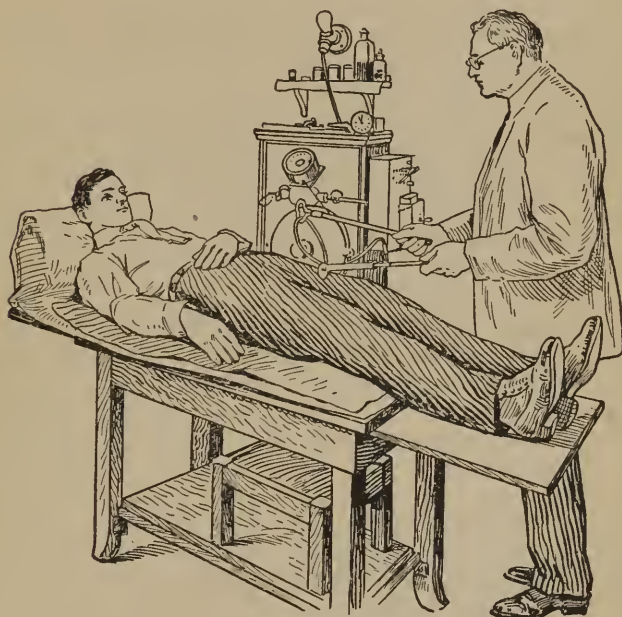
is seen a beautiful brush-like discharge of bluish color, which will leap to any object brought near it. If a plate glass one-half inch thick, or more, is interposed, the discharge will penetrate it. These electrical waves are transmitted to the air with almost the velocity of light waves which move at the rate of over 186,000 miles per second. They are made use of in sending wireless telegraphic messages. The High-frequency discharge is a rich ozone generator. The ozone is of great value in purifying the blood.

**Kills  
Germs**

It has been determined experimentally that if a small wire from a High-frequency apparatus is placed in a tube containing a culture of poisonous germs and the current is applied for one-half hour the germs

will be destroyed, and the toxins or poisonous products which their growth produces will become harmless.

There are three principal forms of High-frequency currents, each named after its inventor: D'Arsonval, Tesla and



High-Frequency Machine (Wappler)

In Use at

Dr. Pierce's Invalids' Hotel,  
Buffalo, N. Y.

Oudin. Each differs from the other in certain characteristics. For general effects the auto-conduction treatment is used. The patient is placed in the center of a cage, the current passing through a coil of wire which encircles the body. There is no direct electrical connection to the patient, nor is there any sensa-

tion of passing current felt; yet electrical sparks can be drawn from the skin when touched. Ozone in liberal quantities is generated and is inhaled by the patient during the treatment. Auto-condensation is obtained by placing the patient upon a specially arranged chair or a mattress, the under surface of which consists of a sheet of metal. This is connected to one terminal of the D'Arsonval High-frequency apparatus. The other terminal is held in the hands of the patient, or for local conditions is attached to a vacuum or other electrode which is applied directly to the part treated.

**Wounds and  
Sores Heal**

Under the action of High-frequency currents, by auto-conduction or auto-condensation, tubercular areas produced in healthy guinea pigs heal, leaving healthy scar tissue. The application of High-frequency currents to human beings brings about favorable changes in general nutrition; there is also an increase in arterial circulation and in the number of respirations. The amount of carbon dioxide exhaled from the lungs is markedly increased, as much as 30 litres per hour, in some cases. The amount of oxygen in the blood is increased and often exceeds the normal physiologic limit of six per cent. In some cases this amounts to more than double

**Waste Poisons  
Are Expelled**

the normal percentage. This increase is due, in part, to the inhalation of ozone. The heat production of the body is also increased, often over 100 calories per hour, leading to a greater elimination of urea (the end product of nitrogenous combustion in the tissues) and the ratio of urea to uric acid becomes normal.

**It Helps  
Nutrition**

Patients under treatment have exhibited a better capacity for work and walking. In the obese, weight is lost, and, strange as it may seem, the lean gain weight. The quantity of urine excreted is increased, as are, also, all of the important ingredients of the urine, as urea, nitrogen, phosphates, sulphates and chlorids.

Some observers have also reported a discharge of small urinary and biliary calculi after auto-conduction treatments. Dizziness and other distressing symptoms to which the aged are subject disappear after a few treatments. Experiments show also that children retarded in growth are stimulated physically and mentally.

**Helps  
Consumption**

In pulmonary tuberculosis and in tuberculosis of bone and of

glands, this current has been the means of helping many patients.

Auto - conduction treatment builds up the body and promotes health. Apostoli claims it "a medicament for the cells and a powerful modifier of the general nutrition which it can at once promote and regulate." He has reported the treatment of 518 cases, and he has noted improvement in general health, increased energy, return of appetite, better sleep, improved digestion; he has also observed an improvement in the disposition of patients with bad tempers. He found that in chronic **Rheumatism** joint inflammation and in chronic rheumatism (the High-frequency current is contra-indicated in acute rheumatism), there was rapid improvement under auto-conduction, and that excellent results were produced in obesity, asthma, in cases of deficient blood, and in an excessive discharge of urine (diabetes).

The Tesla and Oudin currents are applicable to the treatment of local diseases of the urethra, bladder, prostate, vagina, uterus, eye, ear, nose and the throat. The lymphatics and other glands are stimulated to activity, acting as a powerful resolvent and eliminative of chronic inflammatory conditions. These currents applied over the abdomen, stimulate intestinal and gastric peristalsis.

### SINUSOIDAL CURRENT

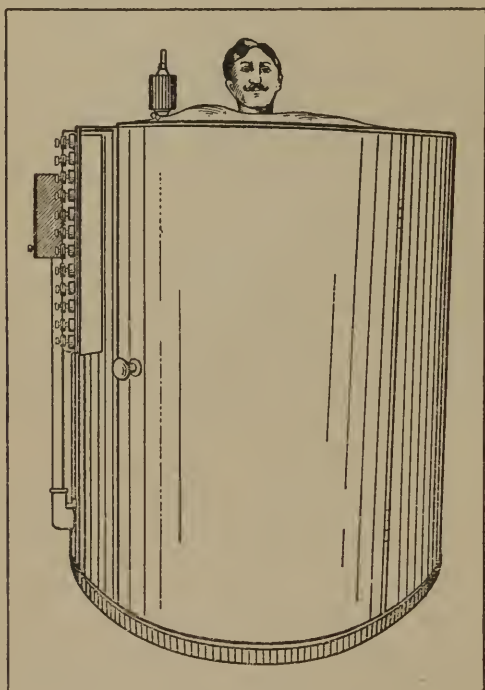
The sinusoidal current is an alternating induced current in which there is gradual rise and fall in the electro - motive force, first in one direction, then in the other, without a break in the continuity of the current. It is likened to the long swell of the ocean wave on a calm day. In visceral conditions, where vital energy is lacking, there is no more efficient agent than the sinusoidal current. Without producing pain or depressing the vitality it acts upon both the striped and the unstriped muscular tissues. It is invaluable in the treatment of disease of the stomach and of the intestines, and has relieved many obstinate cases of constipation that have resisted other methods of treatment.

In inflammation of the prostate or of the seminal vesicles and in nervous affections of the testicles, ovaries, uterus and other organs when there is loss of tone or impairment of nutri-

tion, the sinusoidal current is of the greatest value. Its properties are tonic, stimulant and soothing. This form of electrical current is indispensable to the well-equipped sanitarium.

### FARADIC CURRENT

The Faradic current depends upon induction for its existence. The apparatus is made up of two principal parts, a



Our Electric Bath Cabinet Closed.

primary and a secondary coil; the primary consists of a core of soft iron wire around which is wound a comparatively few turns of coarse wire; over this is placed a tube of insulating material. Next is wound the secondary coil which consists of many turns of very fine wire. When an interrupted current passes through the primary wire an induced current is produced in the second-

ary. The secondary coil is valuable principally for its stimulating effects and is used to exercise paralytic muscles. The current from the primary coil is used for a like purpose, but



X-ray photo showing Broken Wrist.

its effect is more stimulating and irritating. For the purpose of exciting function in both the sensory and the motor nerves the Faradic current is most valuable. As a result of its application the muscles are exercised without effort on the part of the patient. This current also increases nutrition of the parts treated and produces a tonic effect. It may be applied locally by attaching a cord to each of the two terminals of the coil, and at the other end of each cord connecting a sponge, which, before it is used, should be

moistened in an alkaline solution made by dissolving a teaspoonful of common salt in a cupful of warm water.

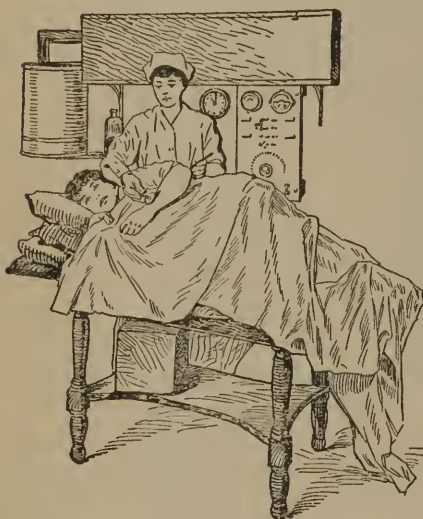
General Faradization is produced by applying the negative, or weaker, pole to the feet which are placed in a foot-bath containing an alkaline solution. The other pole may be connected with a large electrode and passed over the body. Care should be taken to have the current very weak when the upper part of the chest is being treated; otherwise the nerves of the heart and the lungs may be acted upon and harmful effects produced. The muscles of the spine, arms and legs may be treated with stronger currents. In certain cases the Faradic current may be combined with the Galvanic current to good advantage.

## CONTINUOUS CURRENTS. GALVANIC ELECTRICITY

These currents are taken direct from a series of Galvanic cells, or from a direct current used for lighting purposes. Electromotive force and the current strength can be regulated to meet the requirements of the case treated. According to the method

of application, we can produce a stimulating, restorative, or a quieting effect. The conductors, or wires, leading from the battery are dissimilar in polarity. At the positive pole a current passing through water liberates oxygen and causes an acid reaction. This pole contracts the blood-vessels and is used to stop bleeding. It has a quieting effect. It will reduce swelling

Galvanism



Women's Department, Invalids' Hotel,  
Buffalo, N. Y.

and when strong enough acts like an acid caustic, burning the tissues. The negative pole when placed in water liberates hydrogen and causes an alkaline reaction. It dilates the blood-vessels, increasing bleeding. It has the effect of stimulating the sensory nerves. It is an alkaline caustic and liquefies or disintegrates tissues into which it is introduced.

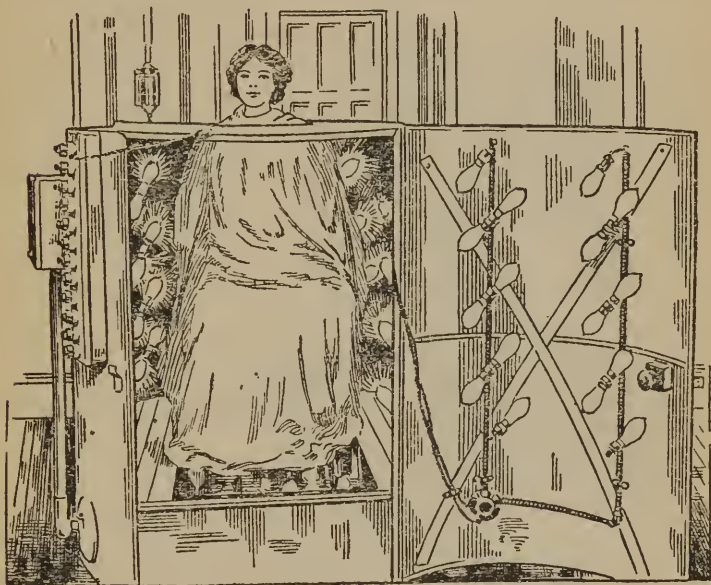
These are the facts that indicate to us which pole should be used in the treatment of disease. We know that in inflammation there is an excess of alkalinity of the tissues, therefore we use the positive pole to reduce such inflammation to neutralize the alkalinity; if the negative pole should be used, the inflammation would be increased instead of diminished and the pain would increase in consequence.

A Galvanic current is also employed to produce electrolysis,

or the destruction of tissue, and is useful in the treatment of fibroid tumors of the womb, moles, removal of hair, etc.

### CATAPHORESIS

This is another property of electricity by which we are able to force medicinal substances into the tissues. Here also the phy-



Artificial Sun Bath.

sician must know which pole is required for the drug he wishes to use; for instance, negative elements as iodine, bromine, and chlorine, have an affinity for the positive pole, but are repelled by the negative pole. In order, therefore, to drive these elements into the tissues, it is necessary to use the negative pole so that they will be driven toward the positive.

If the positive pole were used the negative elements would remain in the sponge or electrode and the treatment would be ineffective.

Metallic cataphoresis, or the introduction of various metals, as zinc, silver, copper, etc., into the tissues, is of great service

in destroying malignant or other tumors. In this case also the terminal should be connected to the negative or positive pole, according to the result desired.

### STATIC ELECTRICITY OR FRANKLINIZATION

This is a manifestation of electrical energy induced from revolving glass plates (Toepler Holtz machine). It belongs to the



Static Electricity Machine, in use at Invalids' Hotel.

high-potential class of currents. Negative and positive charges are given off from the terminals, each having its special use. Several varieties of currents can be induced, as static, surging, wave currents, positive insulation, negative insulation and static induced currents. All of these are of value to the physician, some being used

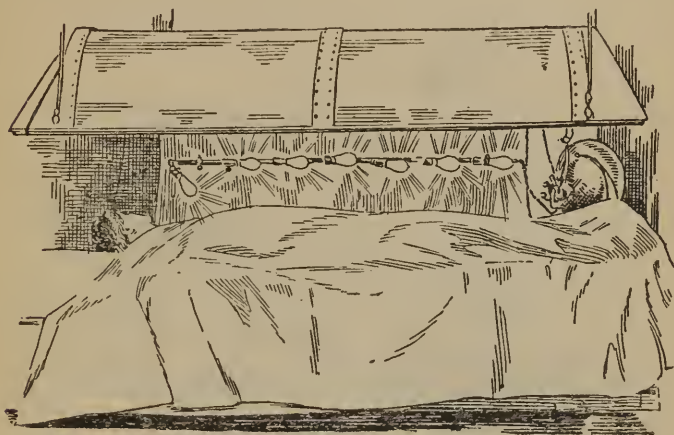
in nervous prostration and other nervous conditions, others in hyperæmia, neuritis, and also for quieting effects. The direct sparks from the machine are useful in paralysis and in the massaging of the nerves and muscles.

It is of the greatest importance that physicians should understand the proper use of these currents, for on this knowledge depends the success or failure of their efforts to cure. Injurious results may often ensue and symptoms may be aggravated if the negative pole is used when the positive is indicated, or if a strong current is applied when a mild one is required. The physician should have a thorough knowledge of the application of electricity before attempting to use it in the treatment of disease,

## PHOTOTHERAPY

## OR TREATMENT WITH CHEMICAL LIGHT RAYS

The curative properties of light have been known for ages. White light is a combination of colors—the principal violet colors of the spectrum—red, orange, yellow, blue, indigo and



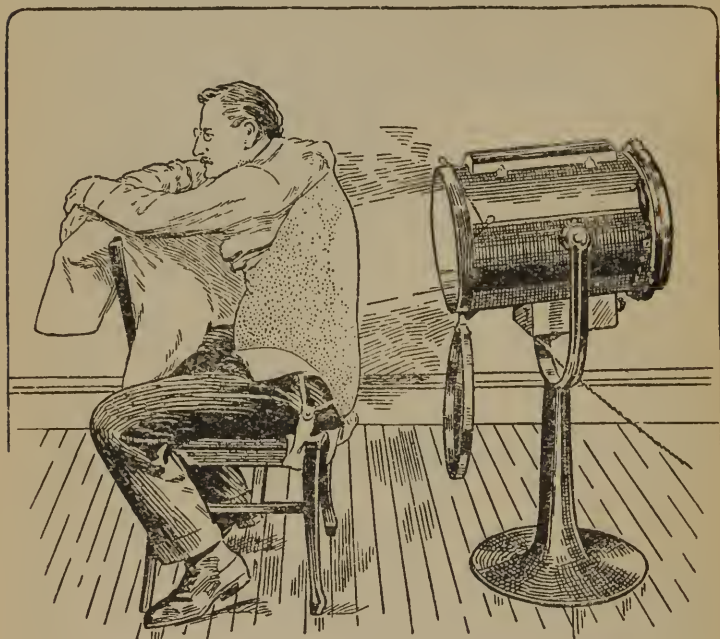
Bath Actinic Rays.

violet, and the invisible ultra-red and ultra-violet. The rays are further divided into heat, luminous and chemic rays. Heat rays are for the most part invisible to the eye, but they powerfully affect the nerves of the skin. The luminous rays are found in the yellow portion, and the chemic in the violet and ultra-violet portions of the spectrum.

Light has a most potent effect upon animal and vegetable life. The turning of leaves and flowers towards the sun is a common phenomenon. Plant growth seems to be influenced more by the yellow rays, flowering by the violet and ultra-violet rays, while the red rays increase aroma. The light rays act upon the nerves of the skin and eyes, stimulating reflex action which acts upon the entire metabolism; the sweat glands become more active, the blood-vessels of the skin dilate and the circulation of the blood is accelerated through the whole body. Over-exposure results in burning of the skin and over-

stimulation of the nerves, producing symptoms of sun-stroke. The chemic rays are exerted principally in their effects upon the nervous system.

In the treatment of disease we have recourse to the use of artificial light—the electric arc and the incandescent. We make



The Electric Arc-lamp.

use of the arc in a large marine search-light. In the application of the arc light the rays are projected upon a reflecting mirror and the field of light produced is concentrated upon the part of the body which is placed about ten or fifteen feet from the apparatus. The arc light possesses properties nearly identical with those of the rays of the sun, which is rich in chemic effects. In the incandescent light the heat rays predominate. Application to the spine stimulates the nerves which are given off from the spinal cord to the various organs of the body. It relieves pain and inflammatory conditions. If the light is concentrated upon the bronchial tubes and the lungs, in cases of

bronchitis, painful cough and difficult breathing are often relieved by a single exposure.

In the treatment of ulcers, septic conditions, eczema and other skin diseases, the use of the arc light properly applied is often beneficial. Chronic joint inflammations, whether from rheumatism, or from injury or infection, frequently respond to the treatment. Applied over the abdomen the arc light is also used to control hemorrhage and a single application will



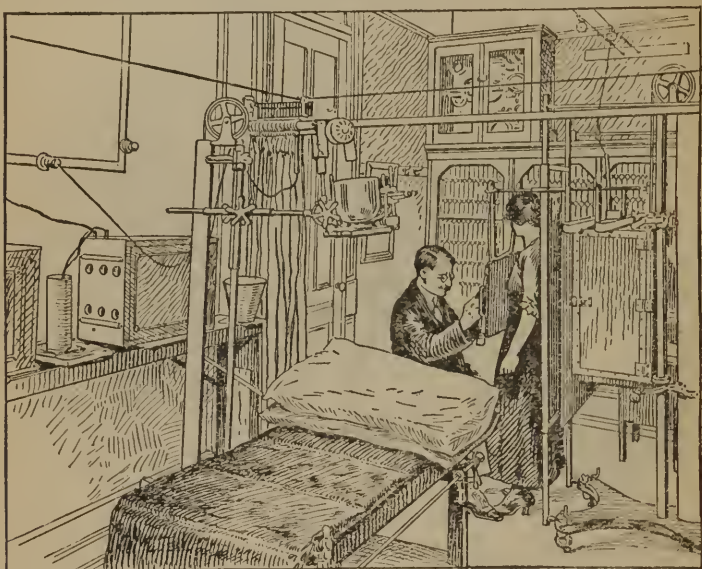
One of the Rooms for Electrical Treatment—Invalids' Hotel.

often stop hemorrhages from the bowels and other organs, and, at the same time, relieve pain. By placing a screen of blue glass between the arc and the patient the heat rays are filtered out. The blue light stimulates metabolism, is very penetrating and has a strong anodyne (relief of pain), and absorbent effect, and it is also anæsthetic to the skin. It is useful in tuberculous diseases of any part or the body, causes the blood-vessels to contract, and is soothing to the nerves. We produce red light by interposing red glass. The red light is efficient in certain skin diseases, and it is claimed that if a patient suffering with small-pox is kept in a room in which the light is filtered through red glass, the pus formation is interrupted or prevented, and that, in consequence, there is no pitting of the skin, and the severity

and duration of the disease are mitigated. Eczema of the face, sunburn and freckles have been cured by exposure to the sunlight, the affected parts being covered with a red veil.

### THE X-RAYS

The X-rays were discovered in 1895, by Dr. Roentgen. They are produced by driving an electrical current at great velocity through a special form of glass tube from which the air has

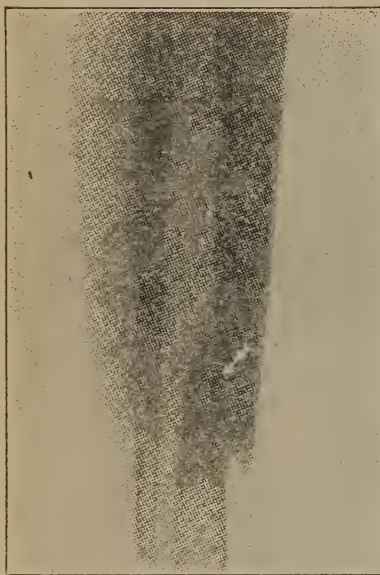


The X-ray Room—Invalids' Hotel.

been reduced to the millionth part of an atmosphere. The cathode stream is directed against a metal projection set at an angle in the center of the tube. This sets up pulsations in the luminiferous ether which are propagated in lines indicated by a hemisphere. The vibrations are probably many times more rapid than those of light.

The X-rays are invisible to the unaided eye. They possess the property of causing brilliant luminosity of fluorescent chemic substances. They also act upon the silver salts in a manner similar to light. If we wish to see the bones of the hands, for instance, the hand is placed upon the back of a

screen made of fluorescent salts and is held between the active tube and the eye. The experiment being best conducted in a darkened room. The bones are then distinctly seen. If a photograph is desired, the hand is placed upon a photographic plate inclosed in a dark envelope. After the exposure the plate is developed in the usual way. We then have a permanent record of the shadow produced. Bones are most distinctly seen, solid organs less distinctly. The hollow organs, as the stomach, intestines, and urinary bladder are shown in distinct outline



X-ray Photo showing Broken Bone  
of the Leg.

after the ingestion or injection of bismuth salts. Any foreign body—as a needle in the flesh or a stone in the bladder—is located without the necessity of painful examination.

The X-ray is known to have curative properties. It is almost a specific in certain forms of skin disease. When it is applied to inoperable cancerous growths, hemorrhage and pain frequently disappear and often the growth itself, especially if it is located externally. Intermittent exposures produce, if properly applied, stimulating effects; if carried further, inflammation, and finally, destructive action upon the tissues.

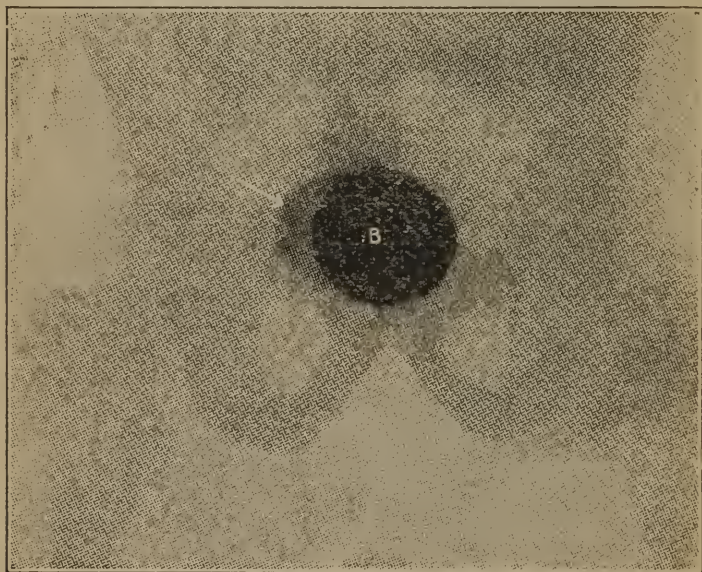
It is known that the X-ray will ionize a gas through which it passes, and the air ionized will remain so for some time. This is shown by the fact that it will discharge an electrified body which has not been affected by the X-ray.

### EXERCISE AND MASSAGE

In the treatment of many diseased conditions great good is accomplished by the use of active or passive exercises judiciously applied.

The physicians of the Invalids' Hotel have for years made

use of the Swedish system of movements, which consists of various mechanical appliances designed to manipulate different parts of the body without the least exertion on the part of the patient. In this way fatigue which is always more or less evident after active exercise is practically avoided and the result is that tone is imparted to the muscles exercised, and by the quickened circulation the nutrition of the part is improved. We also have in use electrical vibratory appliances, by the aid of which we are able to stimulate the tissues treated, relieve congestion of the



X-Ray Photograph of a Stone in the Bladder—Taken at Invalids' Hotel.

veins and lymph, promote absorption of exudations and infiltrations and break up adhesions in tendons, sheaths and joints.

Massage consists of systematic therapeutic manipulation of the issues of the body and also manipulation of the joints. The movements include stroking, pinching, rubbing or friction, and percussion. Massage is an aid to the circulation of blood and lymph. Good results are accomplished by trained masseurs, but we have found the untiring, easily regulated, mechanical massage superior in most cases,

# A New Use for High-frequency Currents

ARRHENIUS AND HIS ELECTRIFIED CHILDREN.

It is reported in the daily press that Prof. Svante Arrhenius, the noted physicist and Nobel prize winner, has completed in Stockholm a series of experiments proving that the Electrical

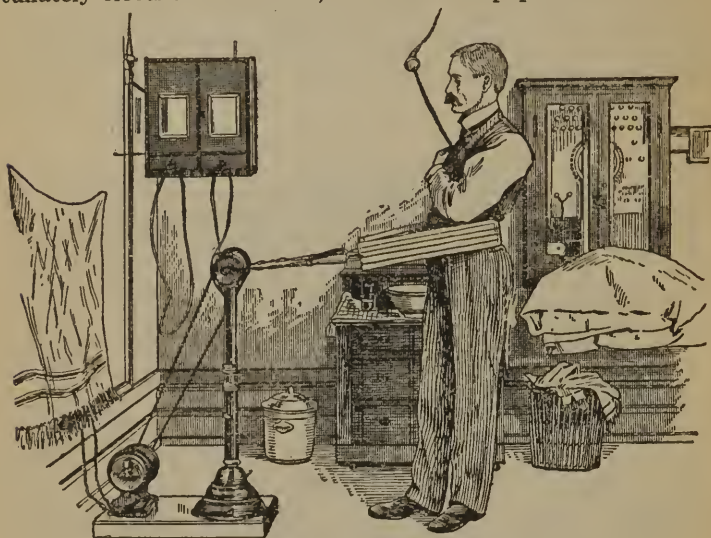


SMALL SECTION OF MECHANICAL MOVEMENT ROOM. INVALIDS' HOTEL.

High-frequency Current is a marvelous aid to the physical and mental development of school children, "nearly doubling their growth and greatly improving their learning." We are informed that two groups of children of practically similar age, physique and mentality were placed in two rooms precisely alike, except that in one were wires carrying High-frequency, alternating currents made known by d'Arsonval. Neither the teachers nor the pupils, it is reported, were aware of their exposure to the "magnetic influence."

At the end of six months, runs the report, the electrically charged children had grown an average of 51 millimeters (2 inches); while the children not thus charged averaged in growth 31 millimeters (1.16 inches). As to psychism, taking twenty as the standard of perfection, the magnetized children

reached in their studies an average of 18.4, while fifteen attained a perfect mark. On the other hand, the unmagnetized children reached an average of 15, only nine attained perfect marks. It would seem also that length of days is to be assured these fortunately electrified children; and the newspaper here referred



ELECTRO-MECHANICAL MASSAGE APPARATUS.

to begin with impressive quotations from Scripture as to living forever and other quotations more or less relevant to this assurance. The magnetized teachers are said to have attested that their faculties were quickened and their powers of endurance increased. "The experiments undoubtedly will be enlarged; and if the results are verified it is thought that the system will be adopted immediately to aid backward children."

It may be assumed then, that metabolism (that process by which oxygen and foodstuffs are converted into bodily tissue) is affected by the d'Arsonval current; and that a faulty metabolism, may be corrected through the elimination brought about by this current and in other ways not as yet perfectly comprehended. So that in a number of diseased states—in "disorders of metabolism," in certain skin lesions, in some nervous disorders, in malignant growths, in diabetes, gout, rheumatism, arterio-sclerosis and so forth—the High-frequency current is an "indicated" measure.—*Scientific American*,

## CURES DISEASE OF ARTERIES.

### High-frequency Current Said to Have Given Remarkable Results.

PARIS.—A remarkable confirmation of the value of “darsenvalisation” or the treatment of certain diseases by the High-frequency current was given before the Academy of Medicine this week by Professor Letulle, director of the Boucicaut Hospital.

Professor Letulle was charged by the academy to investigate thoroughly and report on the communication of Doctor Moutier, who for years had made a special study of the electrical treatment of arteries affected by too much or too little elasticity. “The result is,” says Professor Letulle, “that he has definitely succeeded in curing diseased arteries and restoring a normal circulation to the affected parts.”

Advancing from this point, Doctor Moutier proceeded to supply “darsenvalisation” to several apparently widely different diseases, all of which, however, were due to radial hypotension. He found that treatment of a multitude of heart troubles and affections of the liver, kidneys, varicose veins and diseases of women revealed, remarkable results when dealt with in this way.

“Even neurasthenia and tuberculosis,” said Prof. Letulle, “have been greatly benefited by Dr. Moutier with this treatment. Having made it my business to follow for several years Dr. Moutier’s researches at the Boucicaut Hospital, and having checked all the results, I feel it my duty to render public homage to him. All the facts repeated by him to the Academy are correct, and all the conclusions which follow from them are justified.”

The Academy unanimously passed a vote of thanks to Dr. Moutier for his communication as being of most important value to medical science.—*The Boston Sunday Herald.*

## CHAPTER XXVII

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# FOOD. BEVERAGES. AL- COHOLIC LIQUORS. CLOTHING.

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The human body is continually undergoing changes, which commence with the earliest dawn of existence and end only with death. The old and worn-out materials are constantly being removed to make room for the new. Growth and development, as well as the elimination of worn-out and useless matter, continually require new supplies, which are to be derived from our food. To fulfil these demands it is necessary that the nutriment should be of the proper quality, and of sufficient variety to furnish all the constituents of the healthy body. In order that food may be of utility, like other building materials, it must undergo preparation; the crude substance must be worked up into proper condition and shape for use, in other words, it must be *digested*. But this does not end the process of supply, each different substance must be taken by the different bands of workmen, after due preparation in the workshop, to its appropriate locality in the structure, and there fitted into its proper place; this is *assimilation*. In reality it becomes a portion of the body, and is advantageous in maintaining the symmetry and usefulness of the part to which it is assigned; this constitutes the ultimate object of food, *nutrition*.

**Eating** is the process of receiving the food into the mouth, *i. e.*, *prehension*; *mastication* and *insalivation*—minutely dividing and mixing it with the saliva; *deglutition*—conveying it to the stomach. Plenty of time should be taken

at meals to thoroughly masticate the food and mix it with the saliva, which, being one of the natural solvents, favors its farther solution by the juices of the stomach; the healthy action of the digestive powers is favored by tranquillity of mind, agreeable associations, and pleasant conversation while eating. It is proverbial of the American people that they bolt their food whole, washing it down with various fluids, thus forcing the stomach to perform not only its own duties, but also those of the teeth and salivary glands. This manner of dispatching food, which should go through the natural process above described, is not without its baleful consequences, for the Americans are called a nation of *dyspeptics*.

Eating slowly, masticating the food thoroughly, and drinking but moderately during meals, will allow the juices of the stomach to fulfill their proper function, and healthy digestion and nutrition will result. If the food is swallowed nearly whole, not only will a longer time be required for its solution, but frequently it will ferment and begin to decay before nutritive transformation can be effected, even when the gastric juice is undiluted with the fluids which the hurried eater imbibes during his meal.

**Regularity of Meals** cannot be too strongly insisted upon. The stomach, as well as other parts of the body, must have intervals of rest or its energies are soon exhausted, its functions impaired, and *dyspepsia* is the result. Nothing of the character of food should ever be taken except at regular meal times. Some persons are munching cakes, apples, nuts, candies, etc., at all hours, and then wonder why they have weak stomachs. They take their meals regularly, and neither eat rapidly nor too much, and yet they are troubled with indigestion. The truth is they keep their stomachs almost constantly at work, and hence tired out, which is the occasion of the annoyance and distress they experience.

**Eating too much.** It should always be remembered that the nutrition of our bodies does not depend upon the amount eaten, but upon the amount that is digested. Eating too much is nearly as bad as swallowing the food whole. The stomach is unable to digest all of it, and it ferments and gives rise to unpleasant results. The unnatural distension of the stomach with food causes it to press upon the neighboring

organs, interfering with the proper performance of their functions, and, if frequently repeated, gives rise to serious disease. People more frequently eat too much than too little, and to omit a meal when the stomach is slightly deranged is frequently the best medicine. It is an excellent plan to rise from the table before the desire for food is quite satisfied.

**Late Suppers.** It is generally conceded that late suppers are injurious, and should never be indulged in. Persons who dine late have little need of food after their dinner, unless they are kept up until a late hour. In such cases a moderate meal may be allowed, but it should be eaten two or three hours before retiring. Those who dine in the middle of the day should have supper, but sufficiently early so that a proper length of time may elapse before going to bed, in order that active digestion may not be required during sleep. On the other hand, it is not advisable to go wholly without this meal, but the food eaten should be light, easily digestible, and moderate in quantity. Persons who indulge in hearty suppers at late hours, usually experience a poor night's rest, and wake the next morning unrefreshed, with a headache and a deranged stomach. Occasionally more serious consequences follow; gastric disorders result, apoplexy is induced; or, perhaps, the individual never wakes.

**Feeding Infants.** For at least six or seven months after birth, the most appropriate food for an infant is its mother's milk, which, when the parent is healthy, is rich in all the elements necessary for its growth and support. Next to the mother's milk, that of a healthy nurse should be preferred; in the absence of both, milk from a cow that has recently calved is the most natural substitute, in the proportion of one part water to two parts milk, slightly sweetened. The milk used should be from but one cow. All sorts of paps, gruels, panadas, cordials, laxatives, etc., should be strictly prohibited, for their employment as food cannot be too severely censured. Vomiting, diarrhea, colic, green stools, griping, etc., are the inevitable results of their continued use. The child should be fed at regular intervals, of about two hours, and be limited to a proper amount each time, which, during the first month, is about two ounces. From 11 P. M. to 5 A. M. the child should be nursed but once. As the child grows older the

intervals should be lengthened, and the amount taken at a time gradually increased. The plan of gorging the infant's stomach with food every time it cries, cannot be too emphatically condemned.

After the sixth or seventh month, in addition to milk, bits of bread may be allowed, the quantity being slowly increased, thus permitting the diet to change gradually from fluid to solid food, so that, when the teeth are sufficiently developed for mastication, the child has become accustomed to various kinds of nourishment. Over-feeding, and continually dosing the child with cordial, soothing syrups, etc., are the most fruitful sources of infant mortality, and should receive the condemnation of every mother in the land.

**Preparation of Food.** The production of pure blood requires that all the food selected should be rich in nutritious elements, and well cooked. To announce a standard by which all persons shall be guided in the selection and preparation of their food is impossible. Especially is this the case in a country the inhabitants of which represent almost every nation on the face of the globe. Travelers are aware that there is as much diversity in the articles of food and methods of cookery, among the various nationalities, as in the erection of their dwellings, and in their mental characteristics. In America we have a conglomeration of all these peoples; and for a native American to lay down rules of cookery for his German, French, English, Welsh, and Irish neighbors, or *vice versa*, is useless, for they will seldom read them, and, therefore, cannot profit by them. There are, however, certain conditions recognized by the hygienic writers of every nation. The adequate nutrition of the organic tissues demands a plentiful supply of pure blood, or the digestive apparatus will become impaired, the mental processes deranged, and the entire bony and muscular systems will lose their strength and elasticity and be incapacitated for labor.

**Different Kinds of Food Required.** The different periods and circumstances of life require their appropriate food, and the welfare of mankind demands that it should supply both the inorganic and organic substances employed in the development of every tissue. The inorganic elements employed in our construction, of which *Phosphorus, Sulphur, Soda, Iron,*

*Lime*, and *Potash* are the most important, are not considered as aliments, but are found in the organic kingdom, variously arranged and combined with organic materials in sufficient quantities for ordinary purposes. When, however, from any cause, a lack of any of these occurs, so that their relative normal proportions are deranged, the system suffers, and restoration to a healthy condition can only be accomplished by supplying the deficiency; this may be done by selecting the article of food richest in the element which is wanting, or by introducing it as a medicine. It must be remembered that those substances which enter into the construction of the human fabric, are not promiscuously employed by nature, but that each and every one is destined to fulfill a definite indication.

*Lime* enters largely into the formation of bone, either as a *phosphate* or a *carbonate*, and is required in much greater quantities in early life, while the bone is undergoing development, than afterwards. In childhood the bones are composed largely of animal matter, being pliable and easily moulded. For this reason the limbs of young children bend under the weight of their bodies, and unless care is taken they become bow-legged and distorted. Whenever there is a continued deficiency of the earthy constituents, disease of the bones ensues. Therefore, during childhood, and particularly during the period of dentition, or teething, the food should be nutritious and at the same time contain a due proportion of lime, which is preferable in the form of a phosphate. When it cannot be furnished by the food, it should be supplied artificially. Delayed, prolonged, and tedious dentition generally arises from a deficiency of lime.

With the advance of age it accumulates, and the bone becomes hard, inelastic, and capable of supporting heavy weights. Farther on, as in old age, the animal matter of bone becomes diminished, and lime takes its place, so that the bones become brittle and are easily broken. Lime exists largely in hard water, and to a greater or less extent in milk, and in nearly all foods except those of an acid character.

*Phosphorus* exists in various combinations in different parts of the body, particularly in the brain and nervous system. Persons who perform a large amount of mental labor require more phosphorus than those engaged in other pursuits. It

exists largely in the hulls of wheat, in fish, and in eggs. It should enter to a considerable extent into the diet of brain workers, and the bread consumed by them should be made of unbolted flour.

*Sulphur*, *Iron*, *Soda*, and *Potash* are all necessary in the various tissues of the body, and deficiency of any one of them, for any considerable length of time, results in disease. They are all supplied, variously arranged and combined, in both animal and vegetable food; in some articles they exist to a considerable extent, in others in much smaller quantities. *Sulphur* exists in eggs and in the flesh of animals, and often in water. *Iron* exists in the yolk of eggs, in flesh, and in several vegetables. *Soda* is supplied in nearly all food, and largely in common salt, which is a composition of sodium and hydrochloric acid, the latter entering into the gastric juice. *Potash* exists, in some form or other, in sufficient quantities for health, in both vegetable and animal food.

**Classes of Food.** All kinds of food substances may be divided into four classes: *Proteids*, *Fats*, *Amyloids*, and *Minerals*. *Proteids* are composed of the four elements, carbon, hydrogen, oxygen, and nitrogen, sometimes combined with sulphur and phosphorous. In this class are included the *gluten* of flour; the *albumen*, or white of eggs; and the *serum* of the blood; the *fibrin* of the blood; *syntonin*, the chief constituent of muscle and flesh, and *casein*, one of the chief constituents of cheese, and many other similar, but less frequent substances.

Fats are composed of carbon, hydrogen, and oxygen only, and contain more hydrogen than would be required to form water if united with the oxygen which they contain. All vegetable and animal oils and fatty matters are included in this class.

Amyloids consist of substances which are also composed of carbon, oxygen, and hydrogen only; but they contain just enough hydrogen to produce water when combined with their oxygen, or two parts of hydrogen to one of oxygen. This division includes *sugar*, *starch*, *dextrine*, and *gum*. The above three classes of food-stuffs are only obtained through the activity of living organisms, vegetable or animal, and have been, therefore, appropriately termed by Prof. Huxley, *vital food-stuffs*.

The mineral food-stuffs may, as we have seen, be procured from either the living or the non-living world. They include water and various earthy, metallic, and alkaline salts.

**Variety of Food Necessary.** No substance can serve permanently for food except it contains a certain quantity of proteid matter in the shape of albumen, fibrin, casein, etc., and, on the other hand, any substance containing proteid matter in a shape in which it can be readily assimilated may serve as a permanent vital food-stuff. Every substance, which is to serve as a permanent food, must contain a sufficient quantity, ready-made, of this most important and complex constituent of the body. In addition, it must also contain a sufficient quantity of the mineral ingredients which enter into the composition of the body. Its power of supporting life and maintaining the weight and composition of the body remains unaltered, whether it contains fats or amyloids or not. The secretion of urea, and, consequently, the loss of nitrogen, goes on continually, and the body, therefore, must necessarily waste unless the supply of proteid matter is constantly renewed, since this is the only class of foods that contains nitrogen in any considerable quantity. There can be no absolute necessity for any other food-stuffs but those containing the proteid and mineral elements of the body. From what has been said, it will readily be seen that whether an animal be carnivorous or herbivorous, it begins to starve as soon as its vital food-stuffs consist only of amyloids, or fats, or both. It suffers from what has been termed *nitrogen starvation*, and if proteid matters are withheld entirely, it soon dies. In such a case, and still more in the case of an animal which is entirely deprived of vital food, the organism, as long as it continues to live, feeds upon itself, the waste products necessarily being formed at the expense of its own body.

Although proteid matter is the essential element of food, and under certain circumstances may be sufficient of itself to support the body, it is a very uneconomical food. The white of an egg, which may be taken as a type of the proteids, contains about fifteen per cent. of nitrogen, and fifty-three per cent. of carbon; therefore, a man feeding upon this, would take in about three and a half times as much carbon as nitrogen. It has been proved that a healthy, adult man, taking a

fair amount of exercise and maintaining his weight and body temperature, eliminates about thirteen times as much carbon as nitrogen. However, if he is to get his necessary quantity, about 4,000 grains of carbon, out of albumen, he must eat 7,547 grains of that substance; but this quantity of albumen contains nearly four times as much nitrogen as he requires. In other words, it takes about four pounds of lean meat, free from fat, to furnish 4,000 grains of carbon, the quantity required, whereas one pound yields the requisite quantity of nitrogen. Thus a man restricted exclusively to a proteid diet, must take an enormous quantity of it. This would involve a large amount of unnecessary physiological labor, to comminute, dissolve, and absorb the food, and to excrete the superfluous nitrogenous matter. Unproductive labor should be avoided as much in physiological as in political economy. The universal practice of subsisting on a mixed diet, in which proteids are mixed with fats or amyloids, is therefore justifiable.

Fats contain about 80 per cent. of carbon, and amyloids about 40 per cent. We have seen that there is sufficient nitrogen in a pound of meat free from fat, to supply a healthy adult man for twenty-four hours, but that it contains only one-fourth of the quantity of carbon required. About half a pound of fat, or a pound of sugar, will supply the quantity of carbon necessary. The fat, if properly subdivided, and the sugar, by reason of its solubility, pass with great ease into the circulation, the physiological labor, consequently, being reduced to a minimum.

Several common articles of diet contain in themselves all the necessary elements. Thus, butchers' meat ordinarily contains from 30 to 50 per cent. of fat; and bread contains the proteid, gluten, and the amyloids, starch and sugar, together with minute quantities of fat. However, on account of the proportion in which these proteid and other components of the body exist in these substances, neither of them, by itself, is such a physiologically economical food, as it is when combined with the other in the proportion of three to eight, or three-quarters of a pound of meat to two pounds of bread a day.

It is evident that a variety of food is necessary for health. Animals fed exclusively upon one class, or upon a single article

of diet, droop and die; and in the human family we know that the constant use of one kind of diet causes disgust, even when not very long continued. Consequently, we infer that the welfare of man demands that his food be of sufficient variety to supply his body with all of its component parts. If this is not done the appetite is deranged, and often craves the very article which is necessary to supply the deficiency. After the component parts of the organism have assimilated the nutritious elements of particular kinds of food for a certain length of time, they lose the power of effecting the necessary changes for proper nutrition, and a supply of other material is imperatively demanded. When the diet has been long restricted to proteids, consisting largely of salt meats, fresh vegetables and fruits containing the organic acids, become indispensable; otherwise, the scorbutic condition, or scurvy, is almost sure to be developed. Fresh vegetables and fruits should be eaten in considerable quantities at the proper seasons.

**Value of Animal Food.** The principal animal food used in this country consists of *Pork, Mutton, Beef, and Fish*. Beef and mutton are rich in muscle-producing material. Although pork is extensively produced in some portions of this country, and enters largely into the diet of some classes, yet its use, except in winter, is not to be encouraged. The same amount of beef would give far greater returns in muscular power.

In addition to the meats mentioned, *Wild Game* furnishes palatable, nutritious, and easily-digested food. *Domestic Fowls*, when young, are excellent, and with the exception of geese and ducks, are easily digested. *Wild Birds* are considered much healthier food than those which are domesticated. All of these contain more or less of the elements which enter into the composition of the four classes of foods.

**Vegetable Foods.** *Wheat* is rich in all the elements which compose the four classes, and, when the flour is unbolted, it is one of the best articles for supplying all the elements.

*Barley* stands next to wheat in nourishing qualities, but is not so palatable.

*Oats* are rich in all the elements necessary for nutrition.

Oat-meal is a favorite article of diet among the Scotch, and, judging from their hardy constitutions, their choice is well founded. In consequence of the large proportion of phosphorus which they contain, they are capable of furnishing a large amount of nourishment for the brain.

*Rye* is nutritious, but it is not so rich in tissue-forming material.

*Indian Corn* is an article well known and extensively used throughout the United States, and is a truly valuable one, capable of being prepared in a great variety of ways for food. It contains more carbon than wheat, and less nitrogen and phosphorus, though enough of both to be extremely valuable.

*Rice* is rather meagre in nutriment, it contains but little phosphorous matter, with less carbon than other cereals, and is best and most generally employed as a diet in tropical countries.

*Beans and Peas* are rich in nutritious matter, and furnish the manual laborer with a cheap and wholesome diet.

The *Potato* is the most valuable of all fresh vegetables grown in temperate climates. Its flavor is very agreeable, and it contains very important nutritive and medicinal qualities, and is eaten almost daily by nearly every family in North America. Until very recently it, with the addition of a little butter-milk or skim-milk, constituted almost the sole diet of the Irish people. The average composition of the potato is stated by Dr. Smith to be as follows: Water 75 per cent., nitrogen 2.1, starch 18.8, sugar 3.2, fat 0.2, salts 0.7. The relative values of different potatoes may be ascertained very correctly by weighing them in the hand, for the heavier the tuber the more starch it contains.

*Turnip and Cabbage* are 92.5 per cent. water, and, consequently, poor in nutrition, though they are very palatable. The solid portions of cabbage, however, are rich in albumen.

It is evident that the quantity necessary to maintain the system in proper condition must be greatly modified by the habits of life, the condition of the organism, the age, the sex, and the climate. The daily loss of substance which must be replaced by material from without as we have seen, is very great. In addition to the loss of carbon and nitrogen, about

four and a half pounds of water are removed from the system in twenty-four hours, and it is necessary that about this quantity should be introduced into the system in some form or other, however much it may be adulterated. Professor Dalton states: "From experiments performed while living on an exclusive diet of bread, fresh meat, and butter, with coffee and water for drink, we have found that the entire quantity of food required during twenty-four hours by a man in full health and taking free exercise in the open air is as follows:

Meat, . . . . .	16 oz., or 1.03 lb. avoird.
Bread, . . . . .	19 " 1.19 " "
Butter or fat, . . . .	3½ " 0.22 " "
Water, . . . . .	52 fluid oz., 3.38 " "

That is to say, rather less than two and a half pounds of solid food, and rather over three pounds of liquid food."

**Climate** exerts an important influence on the quantity and quality of food required by the system. In northern latitudes the inhabitants are exposed to extreme cold and require an abundant supply of food, and especially that which contains a large amount of fat. On this account fat meat is taken in large quantities and with a relish. The quantity of food consumed by the natives of the Arctic zone is almost incredible. The Russian Admiral, Saritcheff, relates that one of the Esquimaux in his presence devoured a mass of boiled rice and butter which weighed twenty-eight pounds, at a single meal, and Dr. Hayes states that usually the daily ration of an Esquimau is from twelve to fifteen pounds of meat, one-third of which is fat, and on one occasion he saw a man eat ten pounds of walrus flesh at a single meal. The intense cold creates a constant craving for fatty articles of food, and some members of his own party were in the habit of drinking the contents of the oil-kettle with great appetent relish.

**Digestibility of Food.** Unless an article of diet can be digested it is of no value, no matter how rich it may be in nutriment. The quantity of food taken, will influence to a considerable extent, the time consumed in its digestion. The stomachs of all are not alike in this respect, and the subject

of time has been a difficult one to determine. The experiments of Dr. Beaumont with the Canadian, St. Martin, who accidentally discharged the contents of a loaded gun into his stomach, creating an external opening through which the process of digestion could be observed, have furnished us with the following table, which is correct enough to show relatively, if not absolutely, the time required for the digestion of various articles:

ARTICLES OF DIET.	Mode of Preparation.	Hours.	
		Hours.	Min.
Milk .....	Boiled.....	2	00
“ .....	Raw.....	2	15
Eggs, fresh.....	“ .....	2	00
“ “ .....	Whipped .....	1	30
“ “ .....	Roasted .....	2	15
“ “ .....	Soft boiled .....	3	00
“ “ .....	Hard boiled .....	3	30
“ .....	Fried.....	3	30
Custard .....	Baked.....	2	45
Codfish, cured, dry.....	Boiled.....	2	00
Trout, salmon, fresh.....	“ .....	1	30
“ “ “ .....	Fried.....	1	30
Bass, striped, “ .....	Broiled.....	3	00
Flounder, “ .....	Fried.....	3	30
Catfish, “ .....	“ .....	3	30
Salmon, salted .....	Boiled.....	4	00
Oysters, fresh.....	Raw.....	2	55
“ “ .....	Roasted .....	3	15
“ “ .....	Stewed .....	3	30
Venison steak .....	Broiled.....	1	35
Pig, sucking.....	Roasted .....	2	30
Lamb, fresh.....	Broiled.....	2	30
Beef, fresh, lean, dry.....	Roasted .....	3	30
“ with mustard, etc.....	Boiled.....	3	10
“ “ salt only .....	“ .....	3	36
“ “ “ .....	Fried.....	4	00
“ fresh, lean, rare .....	Roasted .....	3	00
Beefsteak .....	Broiled.....	3	00
Mutton, fresh.....	“ .....	3	00
“ “ .....	Boiled.....	3	00
“ “ .....	Roasted .....	3	15
Veal, fresh .....	Broiled.....	4	00
“ “ .....	Fried.....	4	30
Porksteak .....	Broiled.....	3	15
Pork, fat and lean.....	Roasted .....	5	15
“ recently salted .....	Raw.....	3	00
“ “ “ .....	Stewed .....	3	00
“ “ “ .....	Broiled.....	3	15

ARTICLES OF DIET.	Mode of Preparation.	Hours.	Min.
Pork, recently salted .....	Fried.....	4	15
“ “ “ .....	Boiled.....	4	30
Turkey, wild .....	Roasted .....	2	18
“ tame .....	“ .....	2	30
“ “ .....	Boiled.....	2	25
Goose, wild .....	Roasted .....	2	30
Chickens, full-grown .....	Fricassee.....	2	45
Fowls, domestic .....	Boiled.....	4	00
“ “ .....	Roasted .....	4	00
Ducks, tame .....	“ .....	4	00
“ wild .....	“ .....	4	30
Soup, barley .....	Boiled.....	1	30
“ bean .....	“ .....	3	00
“ chicken.....	“ .....	3	00
“ mutton .....	“ .....	3	30
“ oyster .....	“ .....	3	30
“ beef, vegetables, and bread.....	“ .....	4	00
“ marrow-bones .....	“ .....	4	15
Pig's feet, soured.....	“ .....	1	00
Tripe, soured.....	“ .....	1	00
Brains, animal .....	“ .....	1	45
Spinal marrow, animal .....	“ .....	2	40
Liver, beef, fresh.....	Broiled.....	2	00
Heart, animal .....	Fried.....	4	00
Cartilage.....	Boiled.....	4	15
Tendon .....	“ .....	5	30
Hash, meat, and vegetables.....	Warmed.....	2	30
Sausage, fresh.....	Broiled.....	3	20
Gelatine.....	Boiled.....	2	30
Cheese, old, strong.....	Raw.....	3	30
Green corn and beans .....	Boiled.....	3	45
Beans, pod.....	“ .....	2	30
Parsnips .....	“ .....	2	30
Potatoes .....	Roasted .....	2	30
“ .....	Baked.....	2	30
“ .....	Boiled.....	2	30
Cabbage, head .....	Raw.....	2	30
“ “ with vinegar.....	“ .....	2	00
“ “ .....	Boiled.....	4	30
Carrot, orange .....	“ .....	3	13
Turnips, flat.....	“ .....	3	30
Beets .....	“ .....	3	45
Bread, corn .....	Baked.....	3	15
“ wheat, fresh .....	“ .....	3	30
Apples, sweet, mellow .....	Raw.....	1	30
“ sour, “ .....	“ .....	2	00
“ “ hard.....	“ .....	2	50

Milk is more easily digested than almost any other article of food. It is very nutritious, and, on account of the variety

of the elements which it contains, it is extremely valuable as an article of diet, especially when the digestive powers are weakened, as in fevers, or during convalescence from any acute disease. Eggs are also very nutritious and easily digested. Whipped eggs are digested and assimilated with great ease. Fish, as a rule, are more speedily digested than is the flesh of warm-blooded animals. Oysters, especially when taken raw, are very easily digested. We have known dyspeptics who were unable to digest any other kind of animal food, to subsist for a considerable period upon raw oysters. The flesh of mammalia seems to be more easily digested than that of birds. Beef, mutton, lamb, and venison are easily digested, while fat roast pork and veal are digested with difficulty. According to the foregoing table vegetables were digested in about the same time as ordinary animal food, but it should be remembered that a great part of the digestion of these is effected in the small intestine. Soups, are, as a rule, very quickly digested. The time required for the digestion of bread is about the same as that required for the digestion of ordinary meats. Boiled cabbage is one of the most difficult substances to digest.

**Cookery.** "Cookery," says Mrs. Owen, "Is the art of turning every morsel to the best use; it is the exercise of skill, thought, and ingenuity to make every particle of food yield the utmost nourishment and pleasure, of which it is capable." We are indebted to this practical woman for many valuable suggestions in this art; and some of our recommendations are drawn from her experience.

**Soups.** The nutritious properties, tone, and sweetness of soup depend in the first place upon the freshness and quality of the meat; secondly on the manner in which it is boiled. Soups should be nicely and delicately seasoned, according to the taste of the consumer, by using parsley, sage, savory, thyme, sweet marjoram, sweet basil, or any of the vegetable condiments. These may be raised in the garden, or obtained at the drug stores, sifted and prepared for use. In extracting the juices of meats, in order that soups may be most nutritious, it is important that the meat be put into *cold* water, or that which is not so hot as to coagulate the albumen (which would prevent it from being extracted), and then, by slow heat and

a simmering process, the most nutritious properties will be brought out.

**Beef Soup** may be made of any bone of the beef, by putting it into cold water, adding a little salt, and skimming it well just before it boils. If a vegetable flavor be desired, celery, carrots, onions, turnips, cabbage, or potatoes, may be added, in sufficient quantities to suit the taste.

**Mutton Soup** may be made from the fore-quarter, in the same manner as described above, thickened with pearl-barley or rice, and flavored to suit the taste.

**Boiled Fish.** Clean the fish nicely, then sprinkle flour on a cloth and wrap it around them; salt the water, and, when it boils, put in the fish; let them boil half an hour, then carefully remove them to a platter, adding egg sauce and parsley. To *bake* fish, prepare by cleaning, scaling, etc., and let them remain in salt water for a short time. Make a stuffing of the crumbs of light bread, and add to it a little salt, pepper, butter, and sweet herbs, and stir with a spoon. Then fill the fish with the stuffing and sew it up. Put on butter, salt, pepper, and flour, having enough water in the dish to keep it from burning, and baste often. A four-pound fish will bake in fifty or sixty minutes.

**Broiled Steak.** Sirloin and porter-house steaks should be broiled quickly. Preserve them on ice for a day or two and their tenderness is much increased. Never broil them until the meal is ready to be served.

**Boiled Meat.** When meat is to be boiled for *eating*, put it into boiling water, by which its juices are coagulated and its richness preserved. The slower it boils, the more tender, plump, and white it will be. Meat should be removed as soon as done, or it will lose its flavor and become soggy.

**Pork Steaks.** The best steaks are cut off the shoulder—ham steaks being rather too dry. They should be well fried, in order to destroy the little living parasites, called *Trichinæ*, which sometimes infest this kind of meat. They are introduced into the stomach by eating ham, pork, or sausages made from the flesh of hogs infested by them. Thorough cooking destroys them, and those who will persist in the use of swine's flesh, can afford to have it "*done brown*."

**Baked Mutton.** To bake mutton well, a person should have a brisk, sharp fire, and keep the meat well basted. It requires two hours to bake a leg of mutton weighing eight pounds.

**Bread.** The health and happiness of a family depend, to a certain extent, on good, well-baked bread. At all events, our enjoyment would be greater if it were only better prepared. We make the following extract from an article printed by the State Board of Health, concerning the food of the people of Massachusetts: "As an example of good bread we would mention that which is always to be had at the restaurant of a famous hotel in Boston. It is not better than is found on the continent of Europe on all the great lines of travel, and in common use by millions of people in Germany and France; but with us, it is a rare example of what bread may be. It is made from a mixture of flour, such as is generally sold in our markets, water, salt, and yeast—nothing else. The yeast is made from malt, potatoes, and hops. *The dough is kneaded from one and a half to two hours, and is then thoroughly baked.*" The truth seems to be that the kneading, which in this country takes the housewife's time and muscle, in Europe is done by the help of machinery. So here, in large villages and cities, people might furnish themselves with good bread, by means of co-operative associations, even at a less cost than at present.

#### BEVERAGES.

**Water.** The importance of water in the economy of nature is obvious to all. It is the most abundant substance of which we have knowledge. It composes four-fifths of the weight of vegetables, and three-fourths of that of animals. It is essential to the continuance of organic life. Water is universally present in all of the tissues and fluids of the body. It is not only abundant in the blood and secretions, but it is also an ingredient of the solids of the body. According to the most accurate computations, water is found to constitute from two-thirds to three-fourths of the entire weight of the human body. The following table, compiled by Robin and Verdeil, shows the proportion of water per thousand parts in different solids and fluids:

## QUANTITY OF WATER IN 1,000 PARTS.

Teeth, . . . . .	100	Bile, . . . . .	880
Bones, . . . . .	130	Milk, . . . . .	887
Cartilage, . . . . .	550	Pancreatic juice, . . . . .	900
Muscles, . . . . .	750	Urine, . . . . .	936
Ligaments, . . . . .	768	Lymph, . . . . .	960
Brain, . . . . .	789	Gastric juice, . . . . .	975
Blood, . . . . .	795	Perspiration, . . . . .	986
Synovial fluid, . . . . .	805	Saliva, . . . . .	995

**The Natural Drink of Man.** Water constitutes the natural drink of man. No other liquid can supply its place. Its presence, however, in the body is not permanent. It is discharged from the body in different ways; by the urine, the feces, the breath, and the perspiration. In the first two, it is in a liquid form, in the others in a vaporous form. It is estimated that about forty-eight per cent. is discharged in the liquid, and fifty-two per cent. in the vaporous form; but the absolute as well as the relative amount discharged depends upon a variety of circumstances.

Water is never found perfectly pure, since it holds in solution more or less of almost every substance with which it comes in contact. Rain falling in the country remote from habitations is the purest water that nature furnishes, for it is then only charged with the natural gases of the atmosphere. In cities it absorbs organic and gaseous impurities, as it falls through the air, and flowing over roofs of houses carries with it soot and dust. Water from melted snow is purer than rain-water, since it descends in a solid form, and is therefore incapable of absorbing gases. Rain-water is not adapted to drinking purposes, unless well filtered. All water, except that which has been distilled, contains air, and it is due to this fact, that aquatic animals can live in it; for example, put a fish in distilled water and it will soon die.

**Mineral Impurities.** Rain-water, which has filtered through the soil and strata of the earth, dissolves the soluble materials, and carries them down to lower levels, until they finally collect in the sea. Common well, spring and mineral waters contain from 5 to 60 grains to the gallon; sea-water contains 2,600 grains; while in some parts of the Dead Sea there are 20,000 grains to the gallon. The principal mineral

impurities of well and spring water are lime, magnesia, soda, and oxide of iron, combined with carbonic and sulphuric acids, forming carbonates, sulphates, and chloride of sodium, or common salt.- The most general, however, are carbonate and sulphate of lime.

Mineral waters are usually obtained from springs which contain a considerable amount of saline matter. Those waters which abound in salts of iron are called *chalybeate* or *ferruginous*. Those containing salt are termed *saline*. Those which contain sulphur are termed *sulphurous*. Water derives the quality of hardness from the salts of lime—chiefly the sulphates—which it contains. Hard water, being an imperfect solvent, is unsuitable for washing purposes. There are two varieties of hardness, one of which is temporary, being due to the presence of carbonic acid gas in the water which holds the salts in solution and may be removed by merely boiling the water and thus expelling the gas when the salts are deposited, while the other is permanent and can only be removed by the distillation of the water. It has been ascertained that twelve pounds of the best hard soap must be added to 10,000 gallons of water of one degree of hardness before a lather will remain and, consequently, 0.12 lb. to 100 gallons of water is a measure of one degree of hardness. Since hard water is not so useful in cooking and other domestic purposes, as soft water, causing a great waste of labor and material, it is often highly desirable to soften it, which is effected by the addition of lime in what is known as *Clark's process*. One ounce of quicklime should be added to 1,000 gallons of water for each degree of hardness. It should be first slacked and stirred up in a few gallons and then thoroughly mixed with the entire quantity. Then it should be allowed to remain, and will become clear in about three hours, but should not be drunk for twelve hours.

The purity of drinking water is a matter of much importance. That which contains a minute quantity of lead will give rise to all the symptoms of lead poisoning, if the use of it be sufficiently prolonged. An account is given of the poisoning of the royal family of France, many of whom suffered from this cause when in exile at Claremont. The amount of lead was only one grain in the gallon. Care should there-

fore be taken to avoid drinking the water which has been contained in leaden pipes. It should always be allowed to run a few minutes before being used.

An excess of saline ingredients, which in small quantities are harmless, frequently produces marked disorders of the digestive organs. A small amount of putrescent matter habitually introduced into the system, as in the use of food, is productive of the most serious results, which can be traced to the direct action of the poison introduced. A case is recorded of a certain locality favorably situated with regard to the access of pure air, where an epidemic of fever broke out much to the astonishment of the inhabitants. Upon observation it was found that the attacks of fever were limited to those families who used water from a neighboring well. The disagreeable taste of the water which had been observed, was subsequently traced to the bursting of a sewer, which had discharged a part of its contents into the well. When the cause was removed, there was no recurrence of the evil effects.

**Organic Impurities.** Water is liable to organic contamination from a multitude of causes, such as drainage from dwellings, dust, insects, the decaying of vegetable and animal matter. These impurities may be mechanically suspended or held in solution in the water. Although organic impurities, which are mechanically suspended in water, are poisonous, yet they are generally associated with animalculæ, and these feed upon, and finally consume them. Good water never contains animalculæ. They are never found in freshly fallen rain-water, remote from dwellings, but abound, to a greater or less extent in cisterns, marshes, ponds, and rivers. These little workers serve a useful purpose since they consume the dead organic matter from the water, and, having fulfilled their mission, sink to the bottom and die. Water which contains organic matter is exceedingly dangerous to health, and its use should be carefully avoided.

In low lands where the current of streams is sluggish, and shallow pools abound, the water is apt to be more or less infected with decaying vegetable substances. Many people living in such localities, and wishing to obtain water with as little trouble as possible, dig a hole in the ground, a few feet in

depth, and allow the stagnant surface water to accumulate. This water is used for drinking and cooking. The result is that ague prevails in such localities.

Care should be taken that wells, from which the water is used for household purposes, are located at a distance from barn-yards, vaults and stagnant pools.

**Purification of Water.** There are various methods of purifying water. It may be accomplished by distillation, which is the most perfect method; by filtration through sand, crushed charcoal, and other porous substances, which deprives it of suspended impurities and living organisms; by boiling, which destroys the vitality of all animal and vegetable matters, drives out the gases and precipitates carbonate of lime, which composes the crust frequently seen upon the inside of tea-kettles or boilers; by the use of chemical agents, which may be employed to destroy or precipitate the deleterious substances. Alum is often used to cleanse roily water, two or three grains in solution, being sufficient for a quart. It causes the impurities to settle to the bottom, so that the clear water can be poured or dipped out for use. One or two grains of the permanganate of potassium will render wholesome a gallon of water containing animal impurities.

**How to Use Water.** Very little if any water should be taken at meal time, since the salivary glands furnish an abundance of watery fluid to assist in mastication. When these glands are aided with water to "wash down" the food, their functions become feeble and impaired. The gastric juice is diluted and digestion is weakened. Large draughts of cold water ought never to be indulged in, since they cause derangement of the stomach. When the body is overheated, the use of much water is injurious. It should only be taken in small quantities. Thirst may be partially allayed, without injury, by holding cold water in the mouth for a short time and then spitting it out, taking care to swallow but very little. Travelers frequently experience inconvenience from change of water. If the means are at hand, let them purify their drinking water, if not, they should drink as little as possible. Persons who visit the banks of the Ohio, Missouri, or Mississippi rivers and similar localities, almost invariably suffer from some form of gastric or intestinal disease. Water

standing in close rooms soon becomes unfit to drink and should not be used. A drink of cold water taken on going to bed, and another on rising are conducive to health, especially in the case of persons troubled with constipation. "*Drink water,*" said the celebrated Dubois to the young persons who consulted him, "*drink water, I tell you!*" Du Moulin, the great medical authority of his time, wrote, just previous to his death, "*I leave two great physicians behind me—diet and water.*"

**Tea and Coffee.** These substances are almost universally used as beverages, and when properly employed, serve a four-fold purpose; they quench thirst, excite an agreeable exhilaration, repress the waste of the system, and supply nourishment. In consequence of being generally used at meal times, their stimulant properties are employed to promote digestion, and consequently they are not so objectionable as they might otherwise be. The liquids introduced into the stomach at meal times should not be cold. Tea and coffee are drunk warm, while water, except in a few instances, is always drunk cold, the effects of which have already been shown. That their inordinate use may be injurious no body can deny, but this is equally true of other beverages, even pure, cold water. Scientific investigators inform us that the use of these agents as beverages, when judiciously employed, is not injurious. It has been urged that they are poisonous, but if they are, they are very slow in their operation.

When properly prepared, they are very agreeable beverages, and as man will drink more or less at meals, they are allowable; for if their use were excluded, some other beverage would be sought after, and quite likely one of an alcoholic character employed, so of two evils, if this be an evil, let us choose the least. Unlike alcoholic stimulants, they exhilarate without a depressing reaction after their influence has passed off. But one cup should be drunk at a meal, and it should be of moderate strength. The use of large quantities of drink at meals retards digestion by diluting the digestive fluids. The excessive use of large quantities of strong tea or coffee stimulates the brain and causes wakefulness, and produces irritability of the nervous system. When they are productive of such effects, their use is injurious, and should be

considerably moderated or wholly discontinued. No criterion can be given by which the amount the system will tolerate can be regulated. What one person may take with impunity, may be deleterious to another. Individuals differ greatly in this respect. There are some who cannot tolerate them at all, either because of some peculiarity of constitution, or on account of disease. And sometimes when tea is agreeable and beneficial, coffee disagrees with the individual and *vice versa*. Persons of nervous habits whether natural or acquired, are apt to find their wakefulness and irritability increased by the use of tea, particularly if strong, while coffee will have a tranquilizing effect. Persons of a lymphatic or bilious temperament often find that coffee disagrees with them, aggravating their troubles and causing biliousness, constipation, and headache, while tea proves agreeable and beneficial. Whenever they disagree with the system, the best rule is to abandon their use. We find many persons who do not use either, and yet enjoy health, a fact which proves that they are not by any means indispensable, and, no doubt, were it customary to go without them, their absence would be but slightly missed.

Tea and coffee are adulterated to a very great extent, and persons using them will be greatly imposed upon. This is an evil we cannot remedy. If people make use of them, their experience in selecting them must be their guide; however, it is believed that the Black and Japan varieties of tea are the least apt to be adulterated, and coffee, to insure purity, should be purchased in the berry, and ground by the purchaser.

In preparing tea an infusion should be made by adding boiling water to the leaves, and permitting them to steep for a few minutes only, for a concentrated decoction, made by boiling for a long time, liberates the astringent and bitter principles and drives off the agreeable aroma which resides in a volatile oil.

Coffee should be prepared by adding cold water to the ground berry, and raising it slowly to the boiling point. Long-continued boiling liberates the astringent and bitter principles upon which its stimulant effects to a great extent depend, and drives off with the steam the aromatic oil from which the agreeable taste is derived.

## ALCOHOLIC LIQUORS.

These are divided into three classes: Malted, fermented, and distilled. They all contain more or less alcohol, and their effects are, therefore, in some respects similar, and, in the words of Dr. B. W. Richardson, the great English authority on hygiene:

“To say this man only drinks ale, that man only drinks wine, while a third drinks spirits, is merely to say, when the apology is unclothed, that all drink the same danger. \* \* \* Alcohol is a universal intoxicant, and in the higher orders of animals is capable of inducing the most systematic phenomena of disease. But it is reserved for man himself to exhibit these phenomena in their purest form, and to present, through them, in the morbid conditions belonging to his age, a distinct pathology. Bad as this is, it might be worse; for if the evils of alcohol were made to extend equally to animals lower than man, we should soon have none that were tameable, none that were workable, and none that were eatable.” Researches have shown that the proportion of half a drachm of alcohol to the pound weight of the body, in the quantity which usually produces intoxication, and that an increase of this amount to one drachm immediately endangers the life of the individual. The first symptom which attracts attention, when alcohol commences to take effect upon the body, is an increase in the number of the pulsations of the heart. Dr. Parkes and Count Wolowicz conducted a series of interesting experiments on young adult men. They counted the pulsations of the heart, at regular intervals, during periods when the subject drank only water; and then they counted the beats of the heart in the same individual during successive periods in which alcohol was drunk in increasing quantities.

The following details are taken from their report:

“The highest of the daily means of the pulse observed during the first or water period was 77.5; but on this day two observations were deficient. The next highest daily mean was 77 beats.

If instead of the mean of the eight days, or 73.57, we compare the mean of this one day, viz., 77 beats per minute,

with the alcoholic days, so as to be sure not to over-estimate the action of the alcohol, we find :

On the ninth day, with one fluid ounce of alcohol, the heart beat 430 times more.

On the tenth day, with two fluid ounces, 1,872 times more.

On the eleventh day, with four fluid ounces, 12,960 times more.

On the twelfth day, with six fluid ounces, 30,672 times more.

On the thirteenth day, with eight fluid ounces, 23,904 times more.

On the fourteenth day, with eight fluid ounces, 25,488 times more.

But as there was ephemeral fever on the twelfth day, it is right to make a deduction, and to estimate the number of beats in that day as midway between the twelfth and twenty-third days, or 18,432. Adopting this, the mean daily excess of beats during the alcoholic days was 14,492, or an increase of rather more than thirteen per cent.

The first day of alcohol gave an excess of one per cent., and the last of twenty-three per cent.; and the mean of these two gives almost the same percentage of excess as the mean of the six days.

Admitting that each beat of the heart was as strong during the alcoholic as in the water period (and it was really more powerful), the heart on the last two days of alcohol was doing one-fifth more work.

Adopting the lowest estimate which has been given of the daily work done by the heart, viz., as equal to 122 tons lifted one foot, the heart, during the alcoholic period, did daily work in excess equal to lifting 15.8 tons one foot, and in the last two days did extra work to the amount of twenty-four tons lifted as far.

The period of rest for the heart was shortened, though, perhaps, not to such an extent as would be inferred from the number of beats; for each contraction was sooner over. The beat on the fifth and sixth days after alcohol was left off, and apparently at the time when the last traces of alcohol were eliminated, showed, in the sphygmographic tracing signs of unusual feebleness; and, perhaps, in consequence of this, when the brandy quickened the heart again, the tracing showed a more rapid contraction of the ventricles, but less power than in the alcoholic period. The brandy acted, in fact, on a heart whose nutrition had not been perfectly restored."

The flush often seen on the cheeks of those who are under the influence of alcoholic liquors, and which is produced by a relaxed and distended condition of the superficial blood-vessels, is erroneously supposed by many to merely extend to the parts exposed to view. On this subject, Dr. Richardson says:

“If the lungs could be seen, they, too, would be found with their vessels injected; if the brain and spinal cord could be laid open to view, they would be discovered in the same condition; if the stomach, the liver, the spleen, the kidneys, or any other vascular organs or parts could be laid open to the eye, the vascular engorgement would be equally manifest. In the lower animals I have been able to witness this extreme vascular condition in the lungs, and once I had the unusual, though unhappy opportunity of observing the same phenomenon in the brain of a man who, in a paroxysm of alcoholic delirium, cast himself under the wheels of a railway carriage. The brain, instantaneously thrown out from the skull by the crash, was before me within three minutes after the accident. It exhaled the odor of spirit most distinctly, and its membranes and minute structures were vascular in the extreme. It looked as if it had been recently injected with vermilion injection. The white matter of the cerebrum, studded with red points, could scarcely be distinguished when it was incised, it was so preternaturally red; and the pia mater, or internal vascular membrane covering the brain, resembled a delicate web of coagulated red blood, so tensely were its fine vessels engorged. This condition extended through both the larger and the smaller brain, cerebrum, and cerebellum, but was not so marked in the medulla, or commencing portion of the spinal cord, as in the other portions.

In the course of time, in persons accustomed to alcohol, the vascular changes, temporary only in the novitiate, become confirmed and permanent. The bloom on the nose which characterizes the genial toper is the established sign of alcoholic action on the vascular structure.

Recently, physiological research has served to explain the reason why, under alcohol, the heart at first beats so quickly, why the pulse rises, and why the minute blood-vessels become so strongly injected.

At one time it was imagined that alcohol acts immediately upon the heart by stimulating it to increased motion; and from this idea,—false idea,—I should say,—of the primary action of alcohol, many erroneous conclusions have been drawn. We have now learned that there exist many chemical bodies which act in the same manner as alcohol, and that their effect is not to stimulate the heart, but to weaken the contractile force of the extreme and minute vessels which the heart fills with blood at each of its strokes. These bodies produce, in fact, a paralysis of the organic nervous supply of the vessels which constitute the minute vascular structures. The minute vessels when paralyzed offer inefficient resistance to the force of the heart, and the pulsating organ thus liberated, like the mainspring of a clock from which the resistance has been removed, quickens in action, dilating the feebly resistant vessels, and giving evidence really not of increased, but of wasted power.”

The continued use of alcoholic liquors in any considerable quantity produces irritation and inflammation of the stomach, and structural disease of the liver. Doctor Hammond has shown that alcohol has a special affinity for nervous matter, and is, therefore, found in greater quantity in the brain and spinal cord than elsewhere in the body. The gray matter of the brain undergoes, to a certain extent, a fatty degeneration, and there is a shrinking of the whole cerebrum, with impairment of the intellectual faculties, muscular tremor, and a shambling gait.

Large doses of alcohol cause a diminution of the temperature of the body, which in fevers is more marked than in the normal state.

- In addition to the organic diseases enumerated above, and delirium tremens, the following diseases are frequently the result of the excessive use of alcoholic liquors: Epilepsy, paralysis, insanity, diabetes, gravel, and diseases of the heart and blood-vessels.

The physiological deductions of Dr. Richardson are so much in accord with our own that we quote them in full:

“In the first place we gather from the physiological reading of the action of alcohol that the agent is narcotic. I have compared it throughout to chloroform, and the com-

parison is good in all respects save one, viz., that alcohol is less fatal than chloroform as an instant destroyer. It kills certainly in its own way, but its method of killing is slow, indirect, and by disease.

The well-proven fact that alcohol, when it is taken into the body, reduces the animal temperature, is full of the most important suggestions. The fact shows that alcohol does not in any sense act as a supplier of vital heat as is commonly supposed, and that it does not prevent the loss of heat as those imagine 'who take just a drop to keep out the cold.' It shows, on the contrary, that cold and alcohol, in their effects on the body, run closely together, an opinion confirmed by the experience of those who live or travel in cold regions of the earth. The experiences of the Arctic voyagers, of the leaders of the great Napoleonic campaigns in Russia, of the good monks of St. Bernard, all testify that death from cold is accelerated by its ally alcohol. Experiments with alcohol in extreme cold tell the like story, while the chilliness of the body which succeeds upon even a moderate excess of alcoholic indulgence leads directly to the same indication of truth.

The conclusive evidence now in our possession that alcohol taken into the animal body sets free the heart, so as to cause the excess of motion of which the record has been given above, is proof that the heart, under the frequent influence of alcohol, must undergo deleterious change of structure. It may, indeed, be admitted in proper fairness, that when the heart is passing through these rapid movements it is working under less pressure than when its movements are slow and natural; and this allowance must needs be made, or the inference would be that the organ ought to stop at once, in function, by the excess of strain put upon it. At the same time the excess of motion is injurious to the heart and to the body at large; it subjects the heart to irregularity of supply of blood, it subjects the body in all its parts to the same injurious influence; it weakens, and, as a necessary sequence, degrades both the heart and the body.

Speaking honestly, I cannot, by any argument yet presented to me, admit the alcohols by any sign that should distinguish them from other chemical substances of the paralyzing narcotic class. When it is physiologically understood that what

is called stimulation or excitement is, in absolute fact, a relaxation, a partial paralysis, of one of the most important mechanisms in the animal body, the minute, resisting, compensating circulation, we grasp quickly the error in respect to the action of stimulants in which we have been educated, and obtain a clear solution of the well-known experience that all excitement, all passion, leaves, after its departure, lowness of heart, depression of mind, sadness of spirit. We learn, then, in respect to alcohol, that the temporary excitement it produces is at the expense of the animal force, and that the ideas of its being necessary to resort to it, that it may lift up the forces of the animal body into true and firm and even activity, or that it may add something useful to the living tissues, are errors as solemn as they are widely disseminated. In the scientific education of the people no fact is more deserving of special comment than this fact, that excitement is wasted force, the running-down of the animal mechanism before it has served out its time of motion.

It will be said that alcohol cheers the weary, and that to take a little wine for the stomach's sake is one of the lessons that comes from the deep recesses of human nature. I am not so obstinate as to deny this argument. There are times in the life of man when the heart is oppressed, when the resistance to its motion is excessive, and when blood flows languidly to the centres of life, nervous and muscular. In these moments alcohol cheers. It lets loose the heart from its oppression; it lets flow a brisker current of blood into the failing organs; it aids nutritive changes, and altogether is of temporary service to man. So far, alcohol may be good, and if its use could be limited to this one action, this one purpose, it would be amongst the most excellent of the gifts of science to mankind. Unhappily, the border line between this use and the abuse of it, the temptation to extend beyond the use, the habit to apply the use when it is not wanted as readily as when it is wanted, overbalance, in the multitude of men, the temporary value that attaches truly to alcohol as a physiological agent. Hence, alcohol becomes a dangerous instrument even in the hands of the strong and wise, a murderous instrument in the hands of the foolish and weak. Used too frequently, used too excessively, this agent, which in moderation cheers the

failing body, relaxes its vessels too extremely; spoils vital organs; makes the force of the circulation slow, imperfect, irregular; suggests the call for more stimulation; tempts to renewal of the evil, and ruins the mechanism of the healthy animal before its hour for ruin, by natural decay, should be at all near.

It is assumed by most persons that alcohol gives strength, and we hear feeble persons saying daily that they are being 'kept up by stimulants.' This means actually that they are being kept down; but the sensation they derive from the immediate action of the stimulant deceives them and leads them to attribute passing good to what, in the large majority of cases, is persistent evil. The evidence is all-perfect that alcohol gives no potential power to brain or muscle. During the first stage of action it may enable a wearied or a feeble organism to do brisk work for a short time; it may make the mind briefly brilliant; it may excite muscle to quick action, but it does nothing substantially, and fills up nothing it has destroyed, as it leads to destruction. A fire makes a brilliant sight, but leaves a desolation. It is the same with alcohol.

On the muscular force the very slightest excess of alcoholic influence is injurious. I find by measuring the power of muscle for contraction in the natural state and under alcohol, that so soon as there is a distinct indication of muscular disturbance, there is also indication of muscular failure, and if I wished by scientific experiment to spoil for work the most perfect specimen of a working animal, say a horse, without inflicting mechanical injury, I could choose no better agent for the purpose of the experiment than alcohol. But alas! the readiness with which strong, well-built men slip into general paralysis under the continued influence of this false support, attests how unnecessary it would be to subject a lower animal to the experiment. The experiment is a custom, and man is the subject.

The true place of alcohol is clear; it is an agreeable temporary shroud. The savage, with the mansions of his soul unfurnished, buries his restless energy under its shadow. The civilized man overburdened with mental labor, or with engrossing care, seeks the same shade; but it is shade, after all, in which, in exact proportion as he seeks it, the seeker retires from perfect

natural life. To search for force in alcohol is, to my mind, equivalent to the act of seeking for the sun in subterranean gloom until all is night.

It may be urged that men take alcohol, nevertheless, take it freely, and yet live; that the adult Swede drinks his average cup of twenty-five gallons of alcohol per year and remains on the face of the earth. I admit force even in this argument, for I know under the persistent use of alcohol there is a limited provision for the continuance of life. In the confirmed alcoholic the alcohol is, in a certain sense, so disposed of that it fits, as it were, the body for a long season, nay, becomes part of it; and yet it is silently doing its fatal work. The organs of the body may be slowly brought into a state of adaptation to receive it and to dispose of it. But in that very preparation they are themselves made to undergo physical changes tending to the destruction of their function, to perversion of their structure, and to all those varied modifications of organic parts which the dissector of the human subject learns to recognize,—almost without concern, and certainly without anything more than commonplace curiosity,—as the devastations incident to alcoholic indulgence.”

The statistics collected from the census of the United States for 1860, and given by Doctor De Marmon, in the *New York Medical Journal* for December, 1870, must carry conviction to all minds of the correctness of the foregoing deductions:

“For the last ten years the use of spirits has—1. Imposed on the nation a direct expense of 600,000,000 dollars. 2. Has caused an indirect expense of 600,000,000 dollars. 3. Has destroyed 300,000 lives. 4. Has sent 100,000 children to the poorhouses. 5. Has committed at least 150,000 people into prisons and workhouses. 6. Has made at least 1,000 insane. 7. Has determined at least 2,000 suicides. 8. Has caused the loss by fire or violence, of at least 10,000,000 dollars’ worth of property. 9. Has made 200,000 widows and 1,000 orphans.”

If these were the statistics at that time, with our greatly increased population, what must they be to-day? We will let the reader draw his own conclusions.

**Malted Liquors.** Under this head are included all those liquors into the composition of which malt enters, such

as beer, ale, and porter. The proportion of alcohol in these liquors varies greatly. In beer, it is from two to five per cent.; in Edinburgh ale, it amounts to six per cent.; in porter, it is usually from four to six per cent. In addition to alcohol and water, the malted liquors contain from five to fourteen per cent. of the extract of malt, and from 0.16 to 0.60 per cent. of carbonic acid. They possess, according to Pereira, three properties: They quench thirst; they stimulate, cheer, and, if taken in sufficient quantity, intoxicate; and they nourish or strengthen. The first of these qualities is due to the water entering into their composition; the second, to the alcohol; the third is attributed to the nutritive principles of the malt.

**Objections to their use as Beverages.** These articles are either pure or adulterated. In their pure state the objection to their use for this purpose lies in the fact that they contain alcohol. This, as we have seen, is a poisonous substance, which the human system in a state of health does not need. Its use, when the body is in a normal condition, is uncalled for, and can only be deleterious. Beverages containing this poison are more or less deleterious to healthy persons, according to the amount of it which they contain.

These liquors are frequently adulterated, and this increases their injurious effects. The ingenuity of man has been taxed to increase their intoxicating properties; to heighten the color and flavor, to create pungency and thirst; and to revive old beer. To increase the intoxicating power, tobacco or the seeds of the *Cocculus indicus* are added; to heighten the color and flavor, burnt sugar, licorice, or treacle, quassia, or strychnine, coriander, and caraway seeds are employed; to increase the pungency, cayenne pepper or common salt is added; to revive old beer, or ale, it is shaken up with green vitriol or sulphate of iron, or with alum and common salt.

**Fermented Liquors.** These are cider and wine. Cider contains alcohol to the amount of from five to ten per cent., saccharine matter, lactic acid, and other substances. New cider may be drunk in large quantities without inducing intoxication, but old cider is quite as intoxicating as ale or porter.

The composition of wine is very complex, the peculiar qualities which characterize the different varieties cannot be

ascertained by chemical analysis. Wine is a solution of alcohol in water, combined with various constituents of the grape. The amount of alcohol in wines ranges from six to forty per cent. As beverages, these are open to the same objections as those manufactured from malt. As a medicine, wine is a useful remedy. Concerning its use in this capacity, Prof. Liebig says: "Wine is a restorative. As a means of refreshment when the powers of life are exhausted—as a means of compensation where a misappropriation occurs in nutrition, and as a means of protection against transient organic disturbances, it is surpassed by no product of nature or art." That an article is useful in medicine, however, is no reason why it should be used as a beverage by those in health. It is rather an argument against such a practice. For it is generally true that the drugs used to restore the diseased system to health, are pernicious or poisonous to it when in a normal condition.

**Distilled Liquors.** These are whisky, brandy, and the kindred productions of the still. Whisky is a solution of alcohol in water, mixed with various other principles which impart to it peculiar physical properties. The amount of alcohol which it contains varies from forty-eight to fifty-six per cent. Old whisky is more highly prized than the more recent product of the still, from the fact that when kept for some years certain volatile oils are generated which impart to it a mellowness of flavor.

Brandy is a solution of alcohol in water, together with various other substances. It contains from fifty to fifty-six per cent. of alcohol. Pure brandy is distilled from wine, 1,000 gallons of wine yielding from 100 to 150 gallons of brandy, but a very large proportion of the brandy is made with little or no wine. It is made artificially from high wines by the addition of oil of Cognac, to give it flavor, burnt sugar to give it color, and logwood or catechu, to impart astringency and roughness of taste. The best brandy is obtained by distillation from the best quality of white wines, from the districts of Cognac and Armagnac, in France.

### THE CLOTHING.

There is no physical agent which exerts a more constant or more powerful influence upon health and life, than the

atmosphere. The climate in these latitudes is exceedingly variable, ranging all the way from 110° Fahr. in summer to 40° below zero in the winter season. The body of every individual should be so protected from cold, that it can maintain a mean temperature of 98° Fahr.

When the body is warm there is a free and equal circulation of the blood throughout all the structures. When the surface is subjected to cold, the numerous capillaries and minute vessels carrying the blood, contract and diminish in size, increasing the amount of this fluid in the internal organs, thus causing congestion. The blood must go somewhere, and if driven from the surface, it retreats to the cavities within. Hence this repletion of the vital organs causes pain from pressure and fullness of the distended blood-vessels, and the organic functions are embarrassed. Besides, cold upon the surface shuts up the pores of the skin, which are among the most active and important excretory ducts of the system. It is evident, then, that we require suitable clothing, not only for comfort, but to maintain the temperature and functions essential to health and life.

The chief object to be attained by dress is the maintenance of a uniform temperature of the body. To attain this end, it is necessary that the exhalations of the system, which are continually escaping through the pores of the skin, should be absorbed or conducted away from the person. These exudations occur in the form of sensible or insensible perspiration, and the clothing, to be healthy, should be so porous as to allow them freely to escape into the air.

A substance should also be chosen which is known to be a poor conductor of heat. That generated by the system will thus be retained where it is needed, instead of being dispersed into the atmosphere.

We might add that the better the material for accomplishing these purposes, the less will be needed to be worn; for we do not wish to wear or carry about with us any more material than is necessary. It so happens that all of these qualities are found combined in *flannel*. The value of this article worn next to the skin cannot be overrated, for while it affords protection from cold during the winter months, it is equally beneficial during the heat of summer, because it imbibes the perspiration,

and being very porous, allows it to escape. The skin always feels soft, smooth, and pliable, when it is worn; but, when cotton takes its place, it soon becomes dry and harsh. Its natural adaptability to these purposes, shows that it is equally a comfort and a source of health. Where the skin is very delicate, flannel sometimes causes irritation. In such cases a thin fabric of linen, cotton, or silk, should be worn next the skin, with flannel immediately over it. Where there is a uniform and extreme degree of heat, cotton and linen are very conducive to comfort. But they are unsuitable in a climate or season liable to sudden fluctuations in temperature.

The value of furs, where people are exposed to extreme cold, cannot be overestimated. They are much warmer than wool, and are chiefly used as wraps on going outdoors. They are too cumbrous and expensive for ordinary wear in this latitude, but in places near the poles they constitute the chief clothing of the inhabitants.

The quantity of clothing worn is another important item. The least that is necessary to keep the body well protected and evenly tempered when employed is the rule of health. Some people, instead of wearing flannels next to the body, put on other material in greater abundance, thus confining the perspiration to the skin and making the body chilly. The amount of clothing is then increased, until they are so heavily clad that they cannot exercise. It is far better to wear one thickness of flannel next to the skin, and then cotton, or woollen, for outside garments, and be able to exercise, thus allowing the blood to circulate and to assist in the warming process.

One great fault in dress consists in neglecting to properly clothe the upper extremities. Some people do not reflect upon the necessity, while others are too proud to be directed by plain common sense. In the winter season, the feet should be covered with woollen stockings. The next matter of importance, is to get a thick, broad-soled shoe, so large that it will not prevent the free circulation of the blood. Then for walking, and especially for riding, when the earth is wet and cold, or when there is snow on the ground, wear a flannel-lined rubber or "Arctic" over-shoe. *Be sure and keep the feet comfortable and warm at all times.*

Our next advice is to keep the legs warm. We were called not long ago, to see a young lady who had contracted a severe cold. She had been to an entertainment where the apartments were nicely warmed, and from thence had walked home late in the evening. We inquired into the circumstances of the case, and ascertained that she wore flannel about her chest, and that she also wore rubbers over her shoes, but the other portions of the lower extremities were protected by cotton coverings. In short, her legs were not kept warm, and she took cold by going out from warm rooms into a chilly atmosphere. A good pair of high overshoes might have saved her much suffering. The results of insufficient protection of the lower extremities are colds, coughs, consumption, headaches, pain in the side, menstrual derangements, uterine congestion and disorders, besides disablement for the ordinary and necessary duties of life. All these may be prevented by clothing the legs suitably, and wearing comfortable flannels.

Young people can bear a low temperature of the body better than old people, because they possess greater power of endurance. But that is no reason for unnecessary exposure.

The amount of clothing should be regulated according to the heat-generating power of the individual, and also according to the susceptibility to cold. No two persons are exactly alike in these respects. But it is never proper for young people to reject the counsels of experience, or treat lightly the advice to protect themselves thoroughly against the cold. Many a parent's heart has ached as he has followed the mortal remains of a darling child to the grave, knowing that if good advice had been heeded, in all human probability, the life would have been prolonged.

The most deleterious mechanical errors in clothing are those which affect the chest and body. Tight lacing often plays too important a part in dress. It interferes with the free and healthy movements of the body, and effects a pressure which is alike injurious to the organs of respiration, circulation, and digestion. The great muscle of respiration, the diaphragm, is impeded in its motion, and is, therefore, unable to act freely. The large blood-vessels are compressed, and when the pressure is excessive the heart and lungs are also subjected to restraint and thrown out of their proper positions. From

the compression of the liver and stomach, the functions of digestion are impeded, a distaste for solid food, flatulency and pain after eating are the unmistakable proofs of the injury which is being inflicted.

The evil effects of such pressure are not confined to actual periods of time during which this pressure is applied. They continue after it has been removed and when the chest and trunk of the body have thus been subjected to long-continued pressure they become permanently deformed. These deformities necessarily entail great suffering in child-bearing.

The evil effects of mechanical pressure on other parts of the body are not uncommon. The leg is sometimes so indented by a tight garter that the returning flow of blood through the veins is prevented, and a varicose condition is produced.

Irregular and excessive pressure on the foot by imperfectly fitting shoes or boots produce deformities of the feet and cause much suffering. The high heels which are so common on the shoes of women and children inflict more than a local injury. Every time the body comes down upon the raised heel with its full weight a slight shock or vibration is communicated throughout the entire extent of the spinal column, and the nervous mechanism is thereby injured. Furthermore, displacements of the pelvic organs frequently result from these unnatural and absurd articles of dress.

It is very important that the clothing should be kept clean. That which is worn for a long time becomes saturated with the excretions and exhalations of the body, which prevent free transpiration from the pores of the skin, and thereby induce mental inactivity and depression of the physical powers. Unclean clothing may be the means of conveying disease. Scarlet fever has been conveyed frequently by the clothing of a nurse into a healthy family. All of the contagious diseases have been communicated thru laundries.

Certain dyes used in the coloring of wearing apparel are poisonous, and give rise to local disease of the skin, accompanied in some instances, with constitutional symptoms. The principal poisonous dyes are the red and yellow aniline. A case of poisoning from wearing stockings colored with aniline dyes, in which there were severe constitutional symptoms, came under our observation at the Invalids' Hotel.

## CHAPTER XXVIII

# HYGIENE

### HYGIENE DEFINED.—PURE AIR.

The object of hygiene is the *preservation of health*. Hitherto, we have considered, at some length, the science of functions, or *Physiology*, and now, under the head of *Hygiene*, we will give an outline of the means of maintaining the functional integrity of the system. It is difficult to avoid including under this head Preventive Medicine, the special province of which is to abate, remove, or destroy the many causes of disease.

The Greeks bestowed divine honors upon Æsculapius, because he remedied the evils of mankind and healed the sick. The word hygiene is derived from Hygeia, the name of the Greek goddess of health. As male and female are made one in wedlock, so Medicine and Hygiene, restoration and preservation, are inseparably united.

Hygiene inculcates sanitary discipline, medicine, remedial discipline; hygiene prescribes healthful agencies, medical theory and practice, medicinal agencies; hygiene ministers with salubrious and salutary agents, medicine assuages with rectifying properties and qualities; hygiene upholds and sustains, medical practice corrects and heals; the one is preservative and conservative, the other curative and restorative. These discriminations are as radical as health and sickness, as distinct as physiology and pathology, and to confound them is as unnatural as to look for the beauties of health in the chamber of sickness,

The true physician brings to his aid Physiology, Hygiene, and Medicine, and combines the science of the former with the art of the latter, that restoration may be made permanent, and the health preserved by the aid of hygiene. But when any one makes Hygiene exclusively the physician, or deals wholly in hygienic regulations with little respect for physiology, or lavishly advertises with hygienic prefixes, we may at once consider it a display, not of genuine scientific knowledge, but only of the ignorance of a quack. Some of the modern twaddle about health is a conglomeration of the poorest kind of trash, expressing and inculcating more errors and whims than it does common sense. Many persons dilate upon these subjects with amazing flippancy, their mission seeming to be to traduce the profession rather than to act as help-mates and assistants. We do not believe that there is any real argument going on between the educated members of the medical profession but rather that the senseless clamor we occasionally hear comes only from the stampede of some routed, demoralized company of quacks.

In the following pages we shall introduce to the reader's attention several important hygienic subjects, although there are many more that ought to receive special notice. Such as we do mention, demand universal attention, because a disregard of the conditions which we shall enumerate, is fraught with great danger. Our lives are lengthened or shortened by the observance or neglect of the rules of common sense, and these do not require any great personal sacrifice, or the practice of absurd precautions.

### PURE AIR FOR RESPIRATION.

Ordinary atmospheric air contains nearly 2,100 parts of oxygen and 7,900 of nitrogen, and about three parts of carbonic acid, in 10,000 parts; expired air contains about 470 parts of carbonic acid, and only between 1,500 and 1,600 parts of oxygen, while the quantity of nitrogen undergoes little or no alteration. Thus air which has been breathed has lost about five per cent. of oxygen and has gained nearly five per cent. of carbonic acid. In addition the expired air contains a greater or less quantity of highly decomposable animal matter, and, however dry the atmospheric air may be, the

expired air is always saturated with watery vapor, and, no matter what the temperature of the external air may be, that of the exhaled air is always nearly as warm as the blood. An adult man on an average breathes about sixteen times in a minute and at every inspiration takes in about thirty cubic inches of air, and at every expiration exhales about the same amount. Hence, it follows that about  $16\frac{2}{3}$  cubic feet of air are passed through the lungs of an adult man every hour, and deprived of oxygen and charged with carbonic acid to the amount of nearly five per cent. The more nearly the composition of the external air approaches that of the expired air, the slower will be the diffusion of carbonic acid outwards and of oxygen inwards, and the more charged with carbonic acid and deficient in oxygen will the blood in the lungs become. Asphyxia takes place whenever the proportion of carbonic acid in the external air reaches ten per cent., provided the oxygen is diminished in like proportion, and it does not matter whether this condition of the external air is produced by shutting out fresh air from a room or by increasing the number of persons who are consuming the same air; or by permitting the air to be deprived of oxygen by combustion by a fire. A deficiency of oxygen and an accumulation of carbonic acid in the atmosphere, produce injurious effects however, long before the asphyxiating point is attained. Headache, drowsiness, and uneasiness occur when less than one per cent. of the oxygen of the atmosphere is replaced by other matters, and the constant breathing of such an atmosphere lowers vitality and predisposes to disease.

Therefore, every human being should be supplied, by proper ventilation, with a sufficient supply of fresh air. Every adult individual ought to have at least 800 cubic feet of air-space to himself, and this space ought to communicate freely with the external atmosphere by means of direct or indirect channels. Hence, a sleeping-room for one adult person should not be less than nine by ten feet in breadth and length and nine feet in height. What occurred in the Black Hole at Calcutta is an excellent illustration of the effect of vitiated air. One hundred and forty-six Englishmen were confined in a room eighteen feet square, with two small windows on one side to admit air. Ten hours after their imprisonment, only twenty-three were alive.

**Ventilation of School Rooms.** The depression and faintness, from which many students suffer, after being confined in a poorly ventilated school room, is clearly traceable to vitiated air, while the evil is often ascribed to excessive mental exertion. The effect of ventilation upon the health of students is a subject of universal interest to parents and educators, and at present is receiving the marked attentions of school authorities. When trustees and patrons realize that pure air is absolutely essential to health, then they will construct our halls of learning with due regard for the laws of hygiene, and students will not droop on account of the absence of Nature's most bountiful gift, *pure air*. Dr. F. Windsor, of Winchester, Mass., made a few pertinent remarks upon this subject in the annual report of the State Board of Health, of Massachusetts, 1874. One of the institutions, which was spoken of in the report of 1873, as a *model*, in the warming and ventilation of which much care had been bestowed, was visited in December, 1873. He reports as follows: "I visited several of the rooms, and found the air in all, offensive to the smell, the odor being such as one would imagine old boots, dirty clothes, and perspiration would make if boiled down together;" again, "in the new *model* school-house the hot air enters at two registers in the floor on one side, and makes (or is supposed to make) its exit by a ventilator at the floor, on the other side of the room."

Happily modern sanitary methods have greatly improved since 1874. We are living in a time of wonderful scientific investigation and in these days of the Twentieth Century much attention is given by those in high authority to the proper ventilation of schools and factories. In remote places unsanitary methods may still prevail, but in our large cities and towns, and even in most villages, the Board of Health investigates all schools and public places, and medical inspection of every pupil in the school has done much to modify conditions. In the factories also attention is paid to the welfare and health of the employees, and these are regularly inspected by the Board of Health. Of course, there is always room for improvement, but there is no denying that there has been great advancement along sanitary lines. On farms also conditions have changed. Bathrooms, telephones, rural free delivery, etc. make farm life much more agreeable and enjoyable.

**Ventilation of Factories and Workshops.** This is a subject which demands the immediate attention of manufacturers and employers. The odors of oil, coal gas, and animal products, render the air foul and stagnant, and often give rise to violent diseases among the operatives. From two to four hundred persons are often confined in workshops six hundred feet long, with no means of ventilation except windows *on one side only*. The air is breathed and re-breathed, until the operatives complain of languor and headache, which they attribute to overwork. The *real* cause of the headache is the inhalation of foul air at every expansion of the lungs. If the proprietors would provide efficient means for ventilating their workshops, the cost of construction would be repaid with compound interest, in the better health of their operatives and the consequent increase of labor. Our manufacturers must learn and practice the great principle of political economy, namely, that the interests of the laborer and employer are mutual.

**Ventilation of Our Dwellings.** Not less important is the ventilation of our dwellings; each apartment should be provided with some channel for the escape of the noxious vapors constantly accumulating. Most of the tenements occupied by the poor of our cities are literally dens of poison. Their children inhale disease with their earliest breath. What wonder that our streets are filled with squalid, wan-visaged children! Charity, indeed, visits these miserable homes, bringing garments and food to their half-famished inmates: but she has been slow to learn that fresh air is just as essential to life as food or clothing. Care should be taken by the public authorities of every city, that its tenement houses do not degenerate into foul hovels, like those of the poor English laborer, so graphically portrayed by Dickens. But ill-ventilated rooms are not found exclusively in the abodes of the poor. True, in the homes of luxury, the effect of vitiated air is modified by food, etc. Men of wealth give far more attention to the architecture and adornment of their homes, to costly decorations and expensive furniture, than to proper ventilation.

## LIGHT AND HEALTH

Our dwellings ought freely to admit the sunlight. Diseases which have baffled the skill of physicians have been known to yield when the patients were removed from dark rooms to light and cheerful apartments. Lavoisier placed light, as an

agent of health, even before pure air. Plants which grow in the shade are slender and weak, and children brought up in dark rooms are pale, sallow, and rickety. It is a bad practice to avoid the sunlight through fear of spoiling the complexion, since the sun's rays are necessary to give to it the delicate tints of beauty and health. Air is necessary for the first inspiration and the last expiration of our lives, but the purity and healthfulness of the atmosphere depend upon the warming rays of the sun, while our bodies require light in order that their functions may be properly performed. We know that without solar light, there can be no proper vegetable growth, and it is equally necessary for the beauty and perfection of animal development. Our dwellings should therefore be well lighted and made as bright and cheerful as possible. Women who curtain the windows, soften the light, and tint the room with some mellow shade, may do so in order to hide their own faulty complexions. The skin of persons confined in dungeons or in deep mines becomes pale or sickly yellow, the blood grows watery, the skin blotches, and dropsy often intervenes. On the other hand, invalids carried out from darkened chambers into the bright sunlight are stimulated, the skin browns, nutrition becomes more active, the blood improves, and they become convalescent. Light is especially necessary for the healthy growth of children. There is nothing more beautiful and exhilarating than the glorious sunlight. Let its luminous, warming, and physiological forces come freely into our dwellings, enter into the chemistry of life, animate the spirits, and pervade our homes and our hearts with its joy-inspiring and health-imparting influences.

## CHAPTER XXIX

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# PRACTICAL SUMMARY OF HYGIENE.

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1. The first step which should be taken for the prevention of disease, is to make provision for the health of the unborn child. Greater care should be exercised with women who are in a way to become mothers. Those who are surrounded by all the luxuries which wealth can bestow, indulge too much in rich food, and take too little exercise; while the poor get too little nourishment, and work too hard and too long. A woman in this condition should avoid overexertion, and all scenes which excite the passions or powerful emotions. She should take moderate exercise in the open air; eat moderately of wholesome food, and of meat not oftener than twice a day; take tea or coffee in limited quantities, and avoid the use of all alcoholic liquors; she should go to bed early and take not less than nine hours sleep; her clothing should be loose, light in weight, and warm. She should take every precaution against exposure to contagious or infectious diseases.

2. There is no better method for preventing the spread of contagious diseases than perfect isolation of the infected, and thorough disinfection of all articles of clothing or bedding which have been in contact with the infected. Many persons erroneously believe that every child must necessarily have the measles, and other contagious diseases, and they, therefore, take no precautions against the exposure of their children. The liability to infection diminishes as age advances, and those individuals are, as a rule, the strongest and best developed who have never suffered from any of the contagious diseases. Although vaccination is the great safeguard against small-pox, yet it should never prevent the immediate isolation of those who are suffering from this disease.

3. To avoid the injurious effects of impure air, the following rules, should be carefully observed. The admission of air which contains anything that emits an unpleasant odor into closed rooms should be avoided. The temperature of every apartment should be kept as near 70° Fahr. as possible, and the air should not be overcharged with watery vapor. Provisions should be made for the free admission into and escape of air from the room at all times. When an apartment is not in use, it should be thoroughly ventilated by opening the windows. Those who are compelled to remain in an atmosphere filled with dust, should wear a cotton-wool respirator.

4. To insure a healthy condition of the body, the diet of man ought to be varied, and all excesses should be avoided. The total amount of solid food taken in the twenty-four hours should not exceed two and a half pounds, and not more than one-third of this quantity should consist of animal food. Many persons do not require more than one pound and a half of mixed food. To avoid parasitic diseases, meat should not be eaten rare, especially pork. The amount of water taken daily should be six or eight glasses. When exercising and in warm weather plenty of pure water is healthful. Rain water is the purest form of natural water. It should not be taken ice-cold. Hot water has a very beneficial effect on an irritated stomach. A teacupful taken a half hour before eating is very soothing, while if used on retiring it favors sleep.

5. To avoid the evil effects of alcoholic liquors, perfect abstinence is the only safe course to pursue. Although one may use spirituous liquors in moderation for a long period of time and, possibly, remain healthy, yet such an indulgence is unnecessary and exceedingly dangerous. A person who abstains entirely from their use is safe from their pernicious influence; a person who indulges ever so moderately is in danger; a person who relies on such stimulants for support in the hour of need is lost.

6. While the use of tobacco is less pernicious than alcohol in its effects, yet it exerts a profound disturbing influence upon the nervous system, and gives rise to various functional and organic diseases. This is the verdict of those who

have given the subject the most study, and who have had the best opportunities for extensive observation. Suddenly fatal results have followed excesses in the use of tobacco. Therefore, the habit should be avoided, or if already acquired, it should be immediately abandoned.

7. The clothing should be light and porous, adapted in warmth to the season. It is especially important that persons in advanced life should be well protected against vicissitudes of heat and cold. Exposure is the cause of almost all those inflammatory diseases which occur during winter, and take off the feeble and the aged. The under-garments should be kept scrupulously clean by frequent changes. Corsets or bands which impede the flow of blood, compress the organs of the chest or abdomen, or restrict the movements of the body, are very injurious, and should not be worn. Articles of dress which are colored with irritating dye-stuffs, should be carefully avoided.

8. It matters not how varied a person's vocation may be, change, recreation, and rest are required. It is an error to suppose that more work can be done by omitting these. No single occupation which requires special mental or physical work, should be followed for more than eight hours out of the twenty-four. The physical organism is not constructed to run its full cycle of years and labor under a heavier burden than this. Physical and mental exercise is conducive to health and longevity, if not carried too far. It is erroneous to suppose that excessive physical exertion promotes health. Man was never intended to be a running or a jumping machine. In mental work, variety should be introduced. New work calls into play fresh portions of the brain, and secures repose for those parts which have become exhausted. Idleness should be avoided by all. Men should never retire from business as long as they enjoy a fair degree of health. Idleness and inactivity are opposed to nature.

9. The average length of time which a person ought to sleep is eight hours out of the twenty-four, and, as a rule, those who take this amount enjoy the best health. The most favorable time for sleep is between the hours of 10 P. M. and 6 A. M. All excitement, the use of stimulants, and excessive fatigue tend to prevent sleep. Sleeping rooms should be well ven-

tilated, and the air maintained at a equable temperature of as near 60° Fahr. as possible. An inability to sleep at the proper time, or a regular inclination to sleep at other than the natural hours for it, is a certain indication of errors of habit, or of nervous derangement.

10. Prominent among all other measures for the maintenance of Health, is personal cleanliness. Activity in the functions of the skin is essential to perfect health, and this can only be secured by thoroughly bathing the entire body. Strictly, a person should bathe once every twenty-four or forty-eight hours. The body should be habituated to contact with cold water at all seasons of the year, so that warm water may not become a necessity. The simplest and most convenient bath, is the ordinary sponge-bath. An occasional hot-air, or Turkish bath, exerts a very beneficial influence. It cleans out the pores of the skin and increases its activity.

11. The emotions and the passions exert a powerful influence over the physical organism. It is important, therefore, that they be held under restraint by the reasoning faculties. This rule applies equally to joy, fear, and grief; to avarice, anger, and hatred; and, above all, to the sexual passion. They are a prolific source of disease of the nervous system, and have caused the dethronement of some of the most gifted intellects.

# FOOD VALUES.

The table of food values in this list is a guide to the composition of common nutritious elements of human diet.

The three great food elements are:

1st. Protein, of which the most commonly known example is the albumen of egg and beef.

2nd. Fat.

3rd. Starches and sugars, generally called 'carbohydrates.

Fats may largely replace the starches and sugars in the diet of diabetics with benefit. A certain small amount of starches, as much as the system can use up, without producing sugar in the urine, will be found beneficial. Curiously the greater the quantity of sugars and starches consumed by diabetics the greater is the gnawing hunger, thirst and weakness. These foods, starches and sugars, must be reduced and much less taken when there is dryness of the mouth, gnawing hunger, and excessive thirst.

Diabetics should choose foods containing low proportions of starch and sugar.

FOODS	Parts per Hundred.		
	Protein	Fat	Starch and Sugar
<b>MEATS, EDIBLE PORTION:</b>			
Beef, average.....	17.1	27.3	...
" cooked .....	27.5	15.5	...
" ribs, raw.....	13.9	21.2	...
" sirloin, raw....	16.5	16.2	...
" rump, raw.....	13.8	20.2	...
Corned beef.....	14.3	23.8	...
Pickled tongue....	12.0	19.2	...
Salted or smoked beef	26.5	6.9	...
Veal, average.....	19.5	5.4	...
Veal cutlets.....	20.1	7.5	...
Mutton, average....	18.1	7.7	...
" roast .....	25.0	22.6	...
Lamb, leg.....	16.0	13.6	...
" breast .....	15.5	19.0	...
Venison .....	19.2	1.3	...
Pork, lean.....	19.9	6.8	...
" fat .....	14.5	37.3	...
" loin chop.....	13.4	24.2	...
Smoked bacon.....	9.1	62.2	...
" ham .....	14.2	33.4	...
" shoulder ...	13.0	26.6	...
Salt bacon, fat.....	1.9	86.2	...
Sausage, pork.....	13.0	44.2	...
Sausage, German....	18.2	19.7	...
Tripe .....	13.2	16.4	...
Brain .....	8.8	9.3	...
Liver—liver may contain 13 per cent. carbohydrates ....	22.5	4.2	2.5

FOODS	Parts per Hundred.		
	Protein	Fat	Starch and Sugar
Sweetbread .....	16.8	12.1	...
Kidney .....	16.6	4.8	0.4
<b>POULTRY, MEAT ONLY:</b>			
Fowls, chicken.....	22.7	10.1	...
" capon .....	21.6	22.1	...
" broiler .....	22.8	8.8	...
Pheasant .....	24.7	4.6	...
Partridge .....	25.3	1.5	...
Turkey, light meat...	25.7	9.4	...
" dark meat ....	21.4	20.6	...
Duck, breast .....	22.3	2.3	...
" other meat ....	17.4	26.1	...
Goose .....	16.22	31.5	...
Goose, very fat.....	15.8	45.6	...
Pigeon .....	22.9	12.1	...
Quail .....	25.4	7.0	...
Squab, cormorant ...	18.5	23.8	...
Guinea-hen .....	23.4	6.5	...
Canned turkey .....	20.7	29.2	...
" chicken .....	27.7	12.8	...
" quail .....	21.8	88.0	1.7

## SOUP:

Beef .....	4.4	0.4	1.1
Tomato .....	1.8	1.1	5.6
Gumbo, canned .....	2.4	0.2	4.6
Chicken, canned .....	2.9	3.3	5.1
Meat stew .....	4.6	4.3	5.5
Beef tea .....	6.1	0.3	1.0
Pea soup .....	3.6	0.7	7.6
Oxtail soup .....	4.0	1.3	4.3
Turtle .....	6.1	1.0	3.9

FOODS	Parts per Hundred.		
	Protein	Fat	Starch and Sugar
<b>DAIRY PRODUCE:</b>			
Cow's milk .....	4.0	4.0	4.5
Skimmed milk .....	3.4	0.5	5.1
Buttermilk .....	3.8	1.2	3.3
Milk powder .....	90.0	...	...
Cream, medium .....	2.5	18.0	4.5
" clotted .....	6.1	56.2	2.5
Butter .....	2.5	85.0	...
Margarine .....	1.0	82.2	...
Cheese, American .....	30.8	27.7	...
" Stilton .....	36.3	45.8	...
" Roquefort .....	28.3	30.3	...
" Camembert .....	21.8	31.9	...

**AMPHIBIA, EDIBLE PART:**

Frog's legs .....	10.2	0.1	...
Terrapin .....	21.0	3.0	...
Green turtle .....	18.2	0.5	...
Lobster .....	18.1	1.1	0.6
Crab .....	15.8	1.5	0.8
Crawfish .....	16.0	0.8	0.8
Shrimps .....	25.4	1.0	0.2
Oysters .....	5.0	1.3	5.3
Clams .....	10.6	1.1	5.2
Scallops .....	14.7	0.2	3.4
Mussels .....	8.8	1.0	4.2

**FRESH FISH, EDIBLE PART:**

Bass, sea .....	19.8	0.5	...
Black fish .....	18.7	1.3	...
Blue fish .....	19.4	1.2	...
Catfish .....	14.4	20.6	...
Cisco .....	18.5	6.8	...
Cod .....	16.5	0.4	...
Eels .....	18.6	9.1	...
Flounders .....	14.2	0.6	...
Haddock .....	17.2	0.3	...
Halibut steaks .....	18.6	5.2	...
Herring .....	19.5	0.9	...
Kingfish .....	18.9	0.9	...
Lamprey .....	15.0	13.3	...
Mackerel .....	18.7	7.1	...
Perch, white .....	19.3	4.0	...
" yellow .....	18.7	0.8	...
Pickereel-pike .....	18.7	0.5	...
Pike, gray .....	17.9	0.8	...
Pompano .....	18.8	7.5	...
Porgy .....	18.6	5.1	...
Red grouper .....	19.3	0.6	...
Red snapper .....	19.7	1.0	...
Salmon .....	22.0	12.8	...
Shad .....	18.8	9.5	...
Sheepshead .....	20.1	3.7	...
Skate .....	18.2	1.4	...
Smelt .....	17.6	1.8	...

FOODS	Parts per Hundred.		
	Protein	Fat	Starch and Sugar
Sole, plaice .....	11.0	1.0	...
Sturgeon .....	18.1	1.9	...
Tomcod .....	17.2	0.4	...
Trout, brook .....	19.2	2.1	...
" lake or salmon..	17.8	10.3	...
Turbot .....	14.8	14.4	...
Weakfish .....	17.8	2.4	...
Whitefish .....	22.9	6.5	...
Fish roe, shad.....	20.9	3.8	...

**CEREALS, ETC.:**

Sugar, loaf or granulated .....	...	...	96.5
Molasses, sugar cane. ....	...	...	70.0
Maple syrup .....	...	...	71.4
Candy, plain sweets.. ..	...	...	96.0
Honey .....	0.4	...	75.0
Extract of malt.....	6.39	...	70.0
Starch .....	...	...	90.0
Arrowroot .....	0.8	...	83.3
Wheat flour, high grade .....	11.4	1.0	75.0
Wheat flour, low grade .....	14.0	1.9	71.2
Entire wheat flour... ..	13.8	1.9	71.9
Graham flour.....	13.3	2.2	71.4
Wheat breakfast food..	12.1	1.8	75.2
White bread.....	6.8	0.7	52.3
Brown bread.....	5.4	1.8	47.1
Graham bread .....	8.9	1.8	52.1
Whole-wheat bread... ..	6.7	0.9	49.7
Rolls, French.....	8.5	2.5	55.7
Sweet Cake.....	6.3	9.0	63.0
Biscuit, crackers.....	11.3	10.5	70.5
Zwieback .....	9.8	9.9	73.5
Rye meal.....	6.8	0.9	78.9
Rye bread.....	6.0	0.5	48.0
Corn meal, golden... ..	14.0	3.8	70.6
Corn meal, common... ..	9.2	1.9	75.4
Hominy, cooked.....	2.2	0.2	17.8
Corn bread, (Johnny cake) .....	7.9	4.7	46.3
Corn flour.....	7.1	1.3	78.4
Oatmeal .....	15.5	10.5	63.0
Rollod oats .....	12.6	7.2	64.0
Oat breakfast food.. ..	16.7	7.3	66.2
Oatmeal gruel, (water) .....	1.2	0.4	6.3
Buckwheat flour ....	6.4	1.2	77.9
Rice .....	5.0	0.8	83.2
Sago, tapioca .....	0.4	0.1	88.0
Vermicelli .....	10.9	2.0	72.0
Macaroni .....	13.4	0.9	74.1
Barley, pearl .....	8.5	1.1	77.8
Banana flour .....	3.5	1.5	81.6
Prepared cocoa .....	21.34	23.12	40.8

FOODS	Parts per Hundred.		
	Protein	Fat	Starch and Sugar
<b>DRIED LEGUMES:</b>			
Haricot beans .....	18.0	1.7	60.0
Navy beans .....	22.5	1.5	59.6
Soy-beans .....	41.0	13.0	30.0
Lentils .....	22.5	1.0	59.0
Peas .....	22.0	1.0	58.5
Pea meal .....	27.5	1.3	56.7
Peanuts .....	25.8	38.6	24.4
Ground nuts .....	21.8	51.7	17.6
Frijoles .....	21.9	1.3	65.1

<b>FRESH LEGUMES:</b>			
Green peas .....	6.06	0.5	14.03
Green beans .....	2.04	0.3	5.99
Butter beans .....	4.8	0.3	14.6
Shelled beans .....	7.1	0.5	25.0

<b>EGGS WITHOUT SHELL:</b>			
Hen .....	13.5	11.6	...
Duck .....	13.3	14.5	...
Goose .....	13.8	14.4	...
Turkey .....	13.4	11.2	...
Plover .....	19.7	11.7	...

<b>TUBERS AND ROOTS:</b>			
Potatoes .....	1.9	0.2	22.0
Sweet potatoes .....	1.5	0.6	26.0
Jerusalem artichokes .....	3.0	...	14.0
Parsnips .....	2.1	0.5	12.5
Carrots .....	1.0	0.2	10.1
Turnips .....	0.9	0.1	6.1
Beetroot .....	1.3	0.04	18.6
Salsify .....	1.3	0.4	10.8
Radishes .....	0.9	0.1	4.0

<b>VEGETABLES:</b>			
Cabbage .....	1.8	0.2	5.0
Cauliflower .....	2.5	0.3	4.9
Brussels-sprouts .....	4.8	0.4	6.2
Spinach .....	3.1	0.5	3.5
Squash .....	0.7	0.2	4.5
Pumpkin and marrow .....	1.0	0.1	5.2
Asparagus .....	1.9	0.3	2.8
Tomatoes .....	0.9	0.4	4.0
Green Corn .....	3.1	1.1	19.7
Mushrooms .....	2.5	0.4	6.0
Truffles .....	8.9	0.6	7.5
Onions .....	1.5	0.1	10.9
Leeks .....	1.2	0.5	5.8
Celery .....	1.5	0.4	3.1
Lettuce .....	1.4	0.3	2.5
Cucumber .....	0.8	0.2	2.5
Watercress .....	4.2	0.5	6.5
Rhubarb .....	0.4	0.4	2.2
Canned tomato .....	1.2	0.2	4.0

FOODS	Parts per Hundred.		
	Protein	Fat	Starch and Sugar
Canned green corn...	2.8	1.2	19.6
Canned baked beans..	6.9	2.5	19.3
Canned green peas...	2.8	1.2	9.8
Canned succotash ....	3.6	1.0	18.6
Sauerkraut .....	1.7	0.5	3.8

<b>FRUIT:</b>			
Apples, average.....	0.4	0.5	12.5
Rheinheim orange.....	0.4	0.3	15.5
Cooking apples.....	0.6	0.4	10.9
Pears .....	0.4	0.6	11.5
Plums .....	0.7	...	15.0
Greengages .....	0.4	...	13.5
Prunes, French.....	0.4	...	8.2
Prunes, California....	0.8	...	18.5
Apricots .....	0.5	...	11.0
Peaches .....	0.6	0.1	11.5
Nectarines.....	0.6	...	15.6
Olives .....	1.4	21.0	3.5
Cherries .....	0.7	8.0	11.1
Grapes .....	1.0	1.0	15.5
Grapes, sweet.....	0.6	1.0	25.1
Strawberries .....	1.1	0.5	6.5
Raspberries .....	0.5	...	5.5
Blackberries .....	0.9	2.0	6.0
Bilberries .....	0.7	...	5.3
Whortleberries .....	0.7	3.0	5.8
Mulberries .....	0.3	...	11.5
Black currants .....	0.4	...	7.9
Gooseberries .....	0.07	0.5	8.5
Cranberries .....	0.5	0.7	4.0
Melons .....	0.8	0.36	7.5
Water-melon .....	0.4	0.1	6.5
Pineapple .....	0.5	0.3	10.0
Bananas .....	1.5	0.6	21.0
Oranges .....	0.9	0.5	7.6
Lemons .....	1.0	0.8	7.9
Dried apples.....	1.4	3.0	49.1
Dried figs.....	5.5	0.9	65.0
Dried prunes.....	2.5	0.8	66.1
Dried dates.....	4.6	2.0	66.0
Dried raisins.....	2.3	4.8	75.1
Dried currants.....	1.4	2.9	64.9

<b>NUTS, EDIBLE PORTION:</b>			
Brazil nuts.....	15.3	65.0	7.4
Almond nuts.....	21.0	54.9	17.1
Hilbert nuts.....	15.5	65.2	13.0
Walnuts .....	16.7	46.5	14.9
Butternuts .....	28.0	61.1	3.5
Chestnuts, fresh.....	6.2	5.5	42.2
Cocoonut .....	5.7	50.5	27.7
Pecan .....	11.0	71.2	13.2
Peanuts, raw.....	25.7	28.6	24.2
Peanuts, roasted.....	30.5	49.2	16.2

## CHAPTER XXX

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# PHYSICAL EXERCISE. MENTAL CULTURE. SLEEP. CLEANLINESS.

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A well-developed physical organization is essential to perfect health. Among the Greeks, beauty ranked next to virtue, and an eminent author has said that "the nearer we approach Divinity, the more we reflect His eternal beauty." The perfect expression of thought requires the physical accompaniments of language, gesture, etc. The human form is pliable, and, with proper culture, can be made replete with expression, grace and beauty. The cultivation of the intellectual powers has been allowed to supplant physical training to a great extent. The results are abnormally developed brains, delicate forms, sensitive nerves and shortened lives. That the physical and mental systems should be collaterally developed, is a fact generally overlooked by educators. The fullness of a great intellect is generally impaired when united with a weak and frail body. We have sought perfection in animals and plants. To the former we have given all the degree of strength and grace requisite to their peculiar duties; to the latter we have imparted all the delicate tints and shadings that fancy could picture. We have studied the laws of their existence, until we are familiar with every phase of their production; yet it remains for man to learn those laws of his own being, by a

knowledge of which he may promote and preserve the beauty of the human form, and thus render it, indeed, an image of its Maker. When the body is tenanted by a cultivated intellect, the result is a unity which is unique, commanding the respect of humanity, and insuring a successful life to the possessor. Students are as a rule pale and emaciated. Mental application is generally the cause assigned when, in reality, it is the result of insufficient exercise, impure air, and dietetic errors. An intelligent journalist has remarked that "many of our ministers weigh too little in the pulpit, because they weigh too little on the scales." The Greek Gymnasium and Olympian Games were the sure foundations of that education from which arose that subtle philosophy, poetry, and military skill which have won the admiration of nineteen centuries. The laurel crown of the Olympian victor was far more precious to the Grecian youth than the gilded prize is to our modern genius. A popular lecturer has truly remarked, that "we make brilliant mathematicians and miserable dyspeptics; fine linguists with bronchial throats; good writers with narrow chests and pale complexions; smart scholars, but not that union, which the ancients prized, of a sound mind in a sound body. The brain becomes the chief working muscle of the system. We refine and re-refine the intellectual powers down to a diamond point and brilliancy, as if they were the sole or reigning faculties, and we had not a physical nature binding us to the earth, and a spiritual nature binding us to the great heavens and the greater God who inhabits them. Thus the university becomes a sort of splendid hospital with this difference, that the hospital *cures*, while the university *creates* disease. Most of them are indicted at the bar of public opinion for taking the finest young brain and blood of the country, and, after working upon them for four years, returning them to their homes skilled indeed to perform certain linguistic and mathematical dexterities, but very much below par in health and endurance, and, in short, seriously damaged and physically demoralized." We read with reverence the sublime teachings of Aristotle and Plato; we mark the grandeur of Homer and the delicate beauties of Virgil; but we do not seek to reproduce in our modern institutions the gymnasium, which was the real foundation of their genius. Colleges which are now entering upon their career,

should make ample provision for those exercises which develop the *physical man*. This lack of bodily training is common with all classes, and its effects are written in indelible characters on the faces and forms of old and young. Constrained positions in sitting restrict the movements of the diaphragm and ribs and often cause diseases of the spine, or unnatural curvatures, which prove disastrous to health and happiness. The head should be held erect and the shoulders thrown backward, so that at each inspiration the lungs may be fully expanded.

Physical exercise should never be too violent or too prolonged. Severe physical labor, and athletic sports, if indulged in to an extreme degree, produce undue excitability of the heart, and sometimes cause it to become enlarged. There is a form of heart disease induced by undue exertion which may be called a wearing out or wasting away of that organ. It is common in those persons whose occupations expose them to excessive physical labor for too many hours together. This feebleness of heart is felt but little by vigorous persons under forty years of age, but in those who have passed this age it becomes manifest. However, when any person so affected is attacked by any acute disease, the heart is more liable to fail, and thus cause a fatal termination.

Aneurism of the aorta or the large arteries branching off from it, which is a dilatation of the walls of these vessels, caused by the rupture of one or two of their coats, is generally induced by excessive physical strain, such as lifting heavy weights, or carrying weights up long flights of stairs, violent horse-back exercise, or hurrying to catch a train or street car.

**An Erect Carriage** is not only essential to health, but adds grace and beauty to every movement. Although man was made to stand erect, thus indicating his superiority over all other animals, yet custom has done much to curve that magnificent central column, upon the summit of which rests the "grand dome of thought." Many young persons unconsciously acquire the habit of throwing the shoulders forward. The spinal column is weakened by this unnatural posture, its vertebræ become so sensitive and distorted that they cannot easily support the weight of the body or sustain its equilibrium. It is generally believed that persons of sedentary habits are

more liable to become round-shouldered than any other class of individuals. Observation shows, on the contrary, that the manual laborer, or even the idler, often acquires this stooping posture. It can be remedied, not by artificial braces, but by habitually throwing the shoulders backwards. Deformed trunks and crooked spines, although sometimes the effects of disease are more frequently the results of carelessness. Jacques has remarked that "one's standing among his fellow-men is quite as important a matter in a *physiological*, as in a *social* sense." *Walking* is one of the most efficient means of physical culture, as it calls all the muscles into action and produces the amount of tension requisite for their tonicity. Long walks or protracted physical exercise of any kind should never be undertaken immediately after meals. The first essential to a healthful walk is a pleasurable object. Beautiful scenery, rambles in meadows rich with fragrant grasses, or along the flowery banks of water-courses, affords an agreeable stimulus, which sends the blood through the vital channels with unwonted force, and imparts to the cheeks the ruddy glow of health. Our poets acknowledge the silent influence of nature. Wordsworth has expressed this thought in his own sublime way:

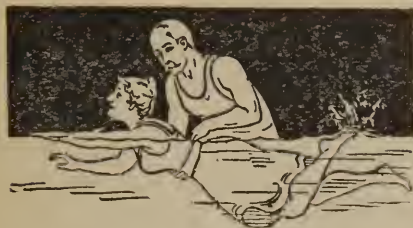
Fig. 1.



"The floating clouds their state shall lend  
 To her: for her the willow bend;  
 Nor shall she fail to see,  
 E'en in the motions of the storm  
 Grace that shall mould the maiden's form  
 By silent sympathy.  
 The stars of midnight shall be dear  
 To her: and she shall lean her ear  
 In many a secret place,  
 Where rivulets dance their wayward round,  
 And beauty, born of murmuring sound,  
 Shall pass into her face."

**Foot Ball, Base Ball, Cricket, Boxing, Golf, Tennis and Fencing,** are all healthful exercises when practised solely with a view to their hygienic advantages, and as such have our approval.

**The Art of Swimming** was regarded by the Greeks as an important accomplishment. As a hygienic agency, it occupies a high place in physical culture. The varied move-

*Fig. 2.**Fig. 3.*

ments impart strength and elasticity to the muscles. It is as charming a recreation for women and girls as for men and boys. Furthermore, it is not only a means of physical culture, but is often essential for self-preservation.

**The Exercises of the Gymnasium** are especially productive of health and longevity. The most important of these are balancing, leaping, climbing, wrestling, and throwing, all of which are especially adapted to the development of the muscles. In conclusion, we offer the following suggestions, viz.: All gymnastic exercises should be practiced in the morning, and in the open air; extremes should be avoided; and it should be

*Fig. 4.*

The Gymnast's Arm.

always borne in mind, that their chief object is to combine, in a proper proportion, mental and physical development. In every relation of life we should cultivate all those faculties which pertain to our physical, moral, and mental natures, subdue our passions, and nature will bestow upon us her richest rewards of health, beauty, and happiness.

## HEALTHFUL EXERCISE.

If one were asked what athletic exercise deserves to be brought back into popularity in America to-day, the answer would of necessity be cycling. The bicycle's hygienic value as a means to healthy exercise cannot be overestimated. In this, as in everything else, immoderation is to be condemned, particularly where persons have not had sufficient training to take long "spins," or attempt racing. Beginners should ride only 10 or 12 minutes at a time—resting then to permit the circulation to become equalized. In all cyclists, at all ages, in veteran riders as well as those not practised in the art, there is, in the beginning of each attempt, a quickened circulation; the pulse is full and bounding, and rarely falls under a hundred pulsations per minute. So long as the exercise is continued, an increase of cardiac motion is observable, and a vigorous circulation is kept up. This accounts for the astounding journeys a fully trained cyclist can accomplish, and also for his endurance without sleep. In spite of the quickened motion of the heart, rarely have riders been known to grow giddy or show symptoms of cardiac embarrassment. A good rider may climb a hill without trouble, yet be unable to climb a flight of stairs without breathlessness and palpitation. Bicycle riding as a means for acquiring strength and vigor, improving the circulation and developing the respiratory organs, is excellent. Fast riding, or "scorching," among those not used to physical exertion, and leaning over the handle-bars so as to ride in a stooping position, are to be heartily condemned. The latter prevents the lungs from getting their full expansion, and cultivates a tendency to round shoulders. Men or women suffering from diseases of the sexual organs should not ride.

The popularity of cycling has greatly declined, especially with women, owing to the danger of encountering the great number of automobiles. The bicycle, however, is still used by workmen going to and from the various plants, and the motorcycle, a modern invention, is much used.

**Riding on Horseback** is a fine exercise for both sexes. It promotes digestion, improves the circulation, and expands and develops the respiratory organs. The pure, fresh air, pleasant scenery, and pleasurable excitement, impart renewed vigor to the equestrian. In the Southern States it is a universal accomplishment, and children are taught to ride as well as to walk.

**Dancing.** Notwithstanding the fact that dancing has been perverted to the basest purposes, has been made the fruitful source of dissipation, and has often laid the foundation for disease, it is yet capable of being made to minister to health and happiness. As a means of physical culture, it favors the development of the muscular system, and promotes health and cheerfulness. When practised for this purpose, Jacques terms it "the best of all in-door exercises," as it brings to bear upon the physical system a great number of energizing and harmonious influences.

### MENTAL CULTURE.

The brain, like all other organs of the body, requires alternate exercise and repose; and, in physical endurance, it is subject to general physiological laws. When exercised with moderation it acquires strength, vigor, and an accelerated activity. Excessive mental exertion is liable to result in softening of the brain, and various nervous diseases, sometimes culminating in insanity, and in many instances proving fatal to life. The mere votaries of pleasure who avoid all effort of the mind, fall into the opposite error. In all cases of intellectual activity, the exertions should be directed to some subject interesting to the student. In this manner duty will become a pleasure, which in turn will re-invigorate the mental functions.

When the mind is confined to one subject for any considerable length of time, it becomes fatigued, and requires relaxation, recreation, rest. This may be obtained by directing the attention to some other subject, either study or amusement, the latter of which is preferable. The amusement, however,

may be of an intellectual or physical character, or both combined, and will, if properly conducted, restore vigor to both mind and body.

Prominent among physical phenomena is the mutual relation between the brain and the organs of nutrition. Mental exertion should be avoided for at least one hour after a hearty meal, and all mental labor which requires concentration of thought ought to be accomplished in the earlier portion of the day, when the brain is refreshed and repaired by the night's repose. Mental, like physical endurance, is modified by age, health, and development. A person accustomed to concentration of thought, can endure a longer mental strain than one inured to manual labor only. One of the most injurious customs, is the cultivation of the intellect at the expense of the physical powers.

**Mental Culture During Childhood.** One of the greatest mistakes which people make in the management of their children is to overtask their mental faculties. Although it is exceedingly gratifying to see children acquire knowledge, and manifest an understanding far beyond their years, this gratification is often purchased too dearly, for precocious children are apt to die young. The tissue of the brain and nerves of children is very delicate; they have not yet acquired the powers of endurance which older persons possess. The greater portion of the nutriment assimilated, is required for growth and organic development, and they can ill afford its expenditure for mental manifestations. They receive impressions easier and learn much more readily than in after life, but it is at the expense of the physical organization. Their mental faculties continue to be developed by the expenditure of brain nutriment, while physical growth and the powers of endurance are arrested. It is much better to give physical development the precedence in order that the mental organism may be well supported and its operations carried into effect; for it must be apparent to all that an ordinary intellect in a healthy body, is capable of accomplishing infinitely more than a strong mind in a *weak* body. Regularity should be observed in exercising the mental functions. For this reason a fixed order in the pursuit of any literary occupation is very essential. The pursuit of the most abstruse

studies will thus become habitual and comparatively easy, a consequence of systematic application. Mental labor should always cease when the train of thought becomes confused, and there is the slightest sensation of depression. All distracting influences should be absent from the mind, in order to facilitate intense study, for the intellect cannot attend perfectly to two subjects at the same time. Painful sensations always have a tendency to paralyze mental exertion. Great care should be taken that the head is not subjected to injury of any kind, as it is almost invariably accompanied by some nervous derangement. Exposure to extreme heat should be carefully avoided. An attack of sun-stroke although it may not be immediately fatal, may occasion tumors in the brain, or some organic disease.

### SLEEP.

For all animated beings sleep is an imperious necessity, as indispensable as food. The welfare of man requires alternate periods of activity and repose. It is a well-established physiological fact, that during the wakeful hours the vital energies are being expended, the powers of life diminished, and, if wakefulness is continued beyond a certain limit, the system becomes enfeebled and death is the result. During sleep there is a temporary cessation of vital expenditures, and a recuperation of all the forces. Under the influence of sleep "the blood is refreshed, the brain recruited, physical sufferings are extinguished, mental troubles are removed, the organism is relieved, and hope returns to the heart."

The severest punishment which can be inflicted upon a person, is to entirely deprive him of sleep. In China, some years since, three criminals were sentenced to be kept awake until they should die. To do this it was necessary to keep a guard over them. The sentinels were armed with sharp-pointed instruments, with which to goad the victims and thus prevent them from sleeping. Life soon became a burden, and, although they were well fed during the time, death occurred sooner than it would have had starvation been the punishment.

**Sleeping Rooms.** The sleeping room should be large and well ventilated, and the air kept moderately cool. The necessity for a fire may be determined by the health of the

occupant. For invalids to maintain a proper temperature in the room, a little fire is useful, especially if in a grate, for the purpose of securing good ventilation. The windows should not be so arranged as to allow a draught upon the body during the night, but yet so adjusted that the inmate may obtain plenty of fresh air. If possible sleep with window wide open.

**The Bed** should not be too soft, but rather hard. Feathers give off animal emanations of an injurious character, and impart a feeling of lassitude and debility to those sleeping on them. No more coverings should be used than are actually necessary for the comfort of the individual. Cotton sheets are warmer than linen, and answer equally as well.

**Sleeping Alone.** Certain effluvia are thrown off from our persons, and when two individuals sleep together each inhales from the other more or less of these emanations. *Consumption*, and many other diseases, not usually considered contagious, are sometimes communicated in this manner. When it is not practicable for individuals to occupy separate beds, the persons sleeping together should be of about the same age, and in good health. Numerous cases have occurred in which healthy, robust children have gradually declined and died within a few months, from the evil effects of sleeping with old people. Again, those in feeble health have been greatly benefited, and even restored, by sleeping with others who were young and healthy.

**Time for Sleep.** *Night* is the proper time for sleep. When day is substituted for night, the sleep obtained does not fully restore the exhausted energies of the system. Nature does not allow her laws to be broken with impunity.

Children require more sleep than old persons. They are sometimes stupefied with "soothing syrups," and preparations of opium, in order to get them temporarily out of the way. Such narcotics are very injurious and dangerous. We have known a young child to be killed by a *single drop* of laudanum. This practice, therefore, cannot be too emphatically condemned.

**How to Put Children to Bed.** The following characteristic lines are from the pen of Fanny Fern, and contain such good advice that we cannot refrain from quoting

them: "Not with a reproof for any of the day's sins of omission or commission. Take any other time than bed-time for that. If you ever heard a little creature sighing or sobbing in its sleep, you could never do this. Seal their closing eyelids with a kiss and a blessing. The time will come, all too soon, when they will lay their heads upon their pillows lacking both. Let them at least have this sweet memory of happy childhood, of which no future sorrow or trouble can rob them. Give them their rosy youth. Nor need this involve wild license. The judicious parent will not so mistake my meaning. If you ever met the man or the woman, whose eyes have suddenly filled when a little child has crept trustingly to its mother's breast, you may have seen one in whose childhood's home 'dignity' and 'severity' stood where love and pity should have been. Too much indulgence has ruined thousands of children; too much love not one."

**Position in Sleep.** The proper position in sleep is upon the right side. The orifice leading from the stomach to the bowels being on this side, this position favors the passage of the contents into the duodenum. Lying on the back is injurious, since by doing so the spine becomes heated, the circulation is obstructed and local congestions are encouraged. The face should never be covered during sleep, since it necessitates the breathing of the same air over again, together with the emanations from the body.

**The Amount of Sleep.** The amount of sleep required varies with the age, habits, condition, and peculiarities of the individual. No definite rule can be given for the guidance of all. The average amount required, however, is eight or nine hours out of the twenty-four. Some persons need more than this, while others can do with less. Since both body and mind are recuperated by sleep, the more they are exhausted the more sleep is required. A person employed at mental labor should have more than one who is merely expending muscular strength. Six hours of unbroken sleep do more to refresh and revive than ten when frequently interrupted. If it is too prolonged it weakens and stupefies both body and mind. If an insufficient amount is taken the flagging energies are not restored. Persons who eat much or use stimulants generally

require more than others. In sleep regularity is desirable. If a person goes to bed at a certain hour for several nights in succession, it will soon become a habit. The same holds true with regard to rising. If children are put to sleep at a stated hour for several days in succession, it will soon become a habit with them.

### CLEANLINESS.

“Cleanliness is next to godliness,” and is essential to the health and vigor of the system. Its importance cannot be overestimated, and it should be inculcated early on the minds of the young. “Even from the body’s purity, the mind receives a secret sympathetic aid.”

When we consider the functions of the skin, with its myriads of minute glands, innumerable little tubes, employed in removing the worn-out, useless matter from the system, we cannot fail to appreciate the utility of frequent bathing with soap and water. Unless these excretions are removed, the glands become obstructed, their functions are arrested, and unpleasant odors arise. Many persons think because they daily bathe the face, neck, and hands, dress the hair becomingly and remove the dirt from their clothing that the height of cleanliness has been reached. From a hygienic point of view, bathing the *entire* body is of much greater importance.

Notwithstanding the necessity for cleanliness of the body, we occasionally meet with persons who, although particular about their personal appearance, permit their bodies to be for weeks and even months without a bath. Such neglect should never exceed one week. Plenty of sunlight and at least one or two general baths every week are essential to perfect health. Cleanliness is necessary to health, beauty, attractiveness, and a cheerful disposition.

## PRACTICAL HINTS

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**ACNE, or Pimples on the Face.** An inflammation of the sebaceous glands and surrounding tissues. The exciting cause is believed to be a micro-organism. The causes may be many, such as puberty, digestive disturbances, constipation, menstrual irregularities, anæmia, sedentary life, general debility and lack of muscular tone. Unless the constipation and indigestion are cured it is impossible to get rid of the pimples.

**TREATMENT:** Wash the face and neck with Dr. Pierce's Medicinal Soap or a good Castile soap. If using Dr. Pierce's Medicinal Soap, allow the soapsuds to dry on the face occasionally. If the bowels do not move freely once or twice each day, use a good laxative, such as is made up of May apple, the leaves of Aloe, and root of Jalap. First extracted and put in a ready to use form by Dr. Pierce over fifty years ago, and sold by druggists as Dr. Pierce's Pleasant Pellets. If suffering from indigestion use a good stomach tonic, such as Dr. Pierce's Golden Medical Discovery, either in liquid or tablet form.

If the twenty-five feet of intestines is choked or clogged up, the blood becomes poisoned and we suffer from what is called autointoxication, or from ptomain poisoning. We notice that we often have headaches, yellow coated tongue, bad taste in mouth, nausea or gas, acid dyspepsia, langour, debility, yellow skin or eyes. The water is strong and high colored, containing brick-dust deposits and bile pigment. At such times one should drink plenty of water between meals, a pint of hot water before breakfast, and occasionally take a dose of the Pleasant Pellets.

**Acne, Rosacea, or Red Pimples.** Caused by longstanding constipation which has produced blood poisoning and indigestion causing excessive blood supply to the face. The same treatment as in Acne, above.

**ABSCESS, or Bealing,** results from inflammation and consists of the formation of matter or pus.

**TREATMENT:** Poultice with hot linseed meal or Anti-phlogistine. Change the poultice every two hours, using as hot as can be borne. Keep on poulticing until abscess breaks. When the skin becomes drawn and appears to be thin and is red at a point you can open the abscess with a needle. Wash and burn the

needle before using, holding it over the flame of a candle for a second to purify. When the matter is all out apply tincture of iodine. Take two or three Pleasant Pellets each night at bedtime with a full tumbler of hot water, and keep up the treatment for a week or so.

**ANÆMIA, or Bloodlessness.** In most cases the person is very pale, white or bloodless in appearance. The lips are often white. If the cause of anæmia is due to indigestion or dyspepsia, a good stomach tonic is needed, such as Dr. Pierce's Golden Medical Discovery. If the stomach is in fair condition, but the man or woman feels that lack of snap and energy which rich, red blood should bring, the blood lacks tone, and the red blood corpuscles are lacking. Every red-blooded person has within his body fifty grains of iron or as much as is contained in an ordinary tenpenny nail. To be active and energetic, we must have good, red blood. One can acquire strength and red blood corpuscles by taking an iron tonic, called "Irontic," composed of iron and herbal extracts, which can be obtained in almost any drug store or by mail by sending 65 cents to the Invalids' Hotel and Surgical Institute, in Buffalo, N. Y. After taking "Irontic" you will feel full of vim, vigor and vitality. As the blood feeds the nerves, if the blood is impoverished one feels nervous, sleepless, fidgety. The blood needs to be built up. When you are pale, anæmic, nervous or tired, try an iron tonic, such as this "Irontic."

• **ARTERIO-SCLEROSIS, or Hardening of the Arteries.** Arterio-Sclerosis is the process of growing old. It is a hardening of the arteries, and it is often said, "We are as old as our arteries." Very often the kidneys are at fault through making poisons circulate in the arteries, and stimulating the muscular fibres in the arteries to close in upon their contents. This results in high blood-pressure, and the heart has to work harder and harder, until it gives out. When it affects the heart, physicians treat it with digitalis, rest, and relief of the dropsy. One should not eat much meat, nor over-eat. If the kidneys are to blame, "Anuric" is the best tonic for them. Most druggists keep "Anuric" in sixty-five cent vials.

**APOPLEXY (Cerebral Hemorrhage).** Apoplexy is one of the common results of chronic Bright's disease. This is the result of high blood pressure due to breaking of a small artery in the brain. It is usually fatal in time. Apoplexy is often known

as shock or "a stroke." When the artery in the brain suddenly becomes useless or breaks, or becomes plugged, in this case it does not supply the brain with blood, and the trouble is located on the brain from its outward manifestations, such as inability to articulate in speech, the pulling of the face muscles or the eye-lids, or paralysis to one of the limbs. The symptoms are sudden unconsciousness and paralysis (usually of half the body—"hemiplegia"). People often live for years after their first attack.

**APHASIA** means a loss of speech. The person knows what he wants to say but he cannot say it, even though his tongue is not paralyzed. This is a symptom of apoplexy, or stroke.

**APPENDICITIS** is probably due to a micro-organism called "streptococcus." The appendix is like the little finger of a glove and hangs off from the point where the small intestine joins the large. Appendicitis is commoner in young people, and more often in men than in women. Halfway between the navel and the hip bone there will be tenderness and pain in pressing. This usually means that the appendix is inflamed. There is sometimes pain, vomiting, tenderness, rapid pulse, fever, changes in the blood.

Those who cannot be operated on at once for acute appendicitis may get through by starving themselves and rest in bed. Ice packs applied to the location of the pain will alleviate. The sufferer should have the attendance of a skilled physician.

**ASTHMA, or Difficulty of Breathing.** The cause of disease is stomach irritation from indigestion and constipation, or may be due to over-abundance of uric acid stored up in the system, chronic bronchitis or heart disease. The same nerves which supply the stomach also go to the bronchial tubes, and irritation in the stomach spreads along the nerves to the lungs and produces bronchial contraction and spasms. Very often a predisposing cause is an accumulation of uric acid due to faulty kidneys and liver.

**TREATMENT:** No medicine in the world will cure asthma until all indigestion and constipation are relieved and the bowels cleaned of all poisons. The kidneys should be excited into better action by taking "Anuric" (anti-uric-acid). First, take particular care that the bowels are clean, by taking castor oil or a gentle laxative made up of leaves of aloes, May Apple and root of jalap, rolled into tiny Pellets, sugar coated, commonly found in all drug stores as Dr. Pierce's Pleasant Pellets. One should follow

rules of diet, confining the food to such as is easily digested, and never overload the stomach. Take after each meal an alterative extract, such as Dr. Pierce's Golden Medical Discovery. To relieve the spasms, use ordinary niter, or saltpeter fumes will relieve. Dissolve five heaping tablespoonfuls of niter (soda nitrate) in a pint of boiling water and soak white blotting paper in this, allowing the paper to dry afterwards and cut up into small pieces. Burn a few pieces of this paper in a dish. The smoke or fumes should be inhaled when an attack of asthma is coming on.

**BACKACHE.** Pain in the back may be due to many causes. In women it is frequently due to disease of the feminine organs, leucorrhea, or a catarrhal condition of the womanly organs, and a woman should know all about herself and these troubles which are distinctly of a womanly nature by reading Chapter XIV. Usually such troubles can be relieved by the taking of Dr. Pierce's Favorite Prescription, and local treatments, instructions for which will be given free, by writing to the Faculty of the Invalids' Hotel. When there is great pain in the muscles of the back, with most men and some women, it is usually caused by what is called lumbago, a cold which settles in the muscles. If the trouble persists and returns with every change of the weather, it is generally called rheumatism. It is usually caused by a deposit of urate salt in the sheath of the muscles of the back. To understand this one must know that the two kidneys, each as large a mass as your fist, perform the duties of removing poisons from the blood from birth to old age. When the kidney cells do not remove the waste materials, uric acid in the form of urate salts is deposited almost anywhere in the muscles of the body and causes great pain, rheumatism or gout. For this condition Anuric Tablets should be taken. Most drug stores can supply these tablets at sixty-five cents a vial, or send that amount to Invalids' Hotel and Surgical Institute, Buffalo, N. Y.

**BILIOUSNESS, or Congestion of the Liver.** If the liver is clogged and stopped up, one suffers from frequent headaches, yellow tongue, nasty taste in the mouth, indigestion or pain, sometimes vomiting, diarrhoea alternating with constipation. Usually the patient has a muddy or yellow complexion. For this, one should take a gentle laxative made of aloes, jalap and May apple, usually found at most drug stores, called Dr. Pierce's Pleasant Pellets. If the trouble is one of long standing, accompanied by

dyspepsia, a good tonic alterative, such as Dr. Pierce's Golden Medical Discovery, should be taken.

**BLACKHEADS.** The treatment should be the same as in Acne, page 401.

**BLEEDING, or Hemorrhage.** To stop the flow of blood in a severe cut, roll up a piece of clean cloth, or better, gauze or cheese cloth, (mosquito netting will do) into a hard lump and press into the cut. If no clean cloth such as cheese cloth or \*gauze can be obtained, a clean piece of tissue paper will do. Over this put a larger fold of cotton and still other pieces until a thick compress is placed hard down upon the cut, and over this bind a bandage as tightly as possible—pressure is important. After the bleeding has stopped dress the cut with tincture of iodine.

**BOILS. (Localized Abscesses of the Skin.)** Very painful, tender, advance rapidly and finally burst and discharge bloody matter. The cause is an impure condition of the blood, which generally arises from imperfect action of the liver and kidneys. Often occur with those who are run down—whose resistance is below par. The infection is often caused by bacteria from shaving brush, razor or shears, or clippers. One boil may infect the adjoining skin and start another.

**TREATMENT:** Spirits of turpentine applied to the boil in its earliest stages will almost always cause it to disappear; but when suppuration has commenced each boil should be kept covered with a collodion dressing so that its discharge cannot possibly get on clothing or spread to skin. When it breaks, paint with tincture of iodine. Most boils heal without interference. Next, purify the blood to prevent subsequent returns to other parts of the body. For this purpose take Dr. Pierce's Golden Medical Discovery, an alterative tonic, which cleanses the blood. One or two Pleasant Pellets each day will aid in the cure. A good laxative like the Pleasant Pellets should be taken once a week. Internal cleanliness is as necessary as a clean skin.

**BREATH—Fetid, or Bad Breath.** Usually bad breath is due to indigestion, dyspepsia or to a blockade in the intestines. If the twenty-five feet of intestines is choked or clogged up, the blood becomes poisoned, and we suffer from what is called auto-intoxication, often accompanied by headache or yellow-coated tongue,

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\*Sterilized gauze should be in every household or factory.

bad taste in mouth, nausea or gas, langour, debility, yellow skin or eyes. At such times one should take a good purgative, such as castor oil, salts, or Dr. Pierce's Pleasant Pellets. Also use a good mouth wash, such as listerine, or wash the mouth out with peroxide of hydrogen and a little water. Clean the teeth thoroughly once a day with a good antiseptic tooth paste.

**BRIGHT'S DISEASE.** See kidneys, page 417.

**BRONCHIAL CATARRH, or Bronchitis.** An inflammation of the lining membrane of the large bronchial tubes, situated just below the collar bone. The cough is incessant, for a day or two it will be dry and hard, after two or three days the cough will bring up frothy, slimy tissues from the lungs. There is considerable fever and a dragging soreness across upper part of chest.

**TREATMENT:** Apply mustard poultices across the chest mornings and nights, keeping on only a few minutes, or ten minutes at most. Keep on the chest a large, thick pad of cotton batting, or absorbent cotton, and hold in place with a wide bandage. Give a good laxative, such as castor oil or Dr. Pierce's Pleasant Pellets. The cough will be alleviated by occasional doses of Dr. Pierce's Golden Medical Discovery. Hot drinks, such as hot lemonade, linseed tea, barley water and a liquid diet are best. A still better cough mixture is Dr. Pierce's Cough Syrup, made up principally of Wild Cherry Bark and other herbal extracts. This can be obtained at most drug stores. It should be on every family's medicine shelf, because it is a simple and harmless remedy for child or adult.

**BRUISES, or Swellings.** Immediately a bruise is received apply very cold water, ice water if possible, by cloths or packs. Keep on the cold applications for several hours. If you have Dr. Pierce's Extract of Smart-Weed in the house apply this after the cold water and it will subdue the inflammation.

**BURNS and SCALDS.** The best treatment is to cover the burn to protect it from the air. Apply Dr. Pierce's Mentha-Soothaline, and cover with a clean cloth. The ordinary household baking soda covered over the burn or scald, with a clean cloth and absorbent cotton over that, is a handy application. Dress every day. Bad burns or scalds over a large surface should be scientifically treated by a physician, with melted paraffin or Am-

brine, as used in the war. In the European war Ambrine was used for severe burns—the treatment is as follows: Surfaces are cleansed by gentle irrigation or by dragging over them wet cotton. When surface is absolutely dry the melted Ambrine is painted or sprayed quickly over the surface, using as hot as patient can bear. Then a thin layer of cotton laid over and another coat of Ambrine—then a thick pad of cotton and bandaged to hold in place. Ambrine is peeled off and applied daily.

**CARBUNCLES.** The same treatment as for boils. (See page 405.)

**CATARRH.** (See page 419.)

**CHAPPED SKIN—How to Treat.** The cure of chapped skin, hands or lips can be brought about by using Dr. Pierce's Mentha-Soothaline. This is a household application which should be always kept on hand. If your druggist does not keep it, send 65 cents to World's Dispensary Laboratory, Buffalo, N. Y.

**COLIC, or Severe Cramps.** When gas collects in the large intestine and cannot move up or down, there follows a severe pain over the bowels. An enema should be taken with a syringe, warm water and soap. This will usually dislodge the gas and relieve. Bring about a natural action and dispel the poisons by taking Dr. Pierce's Pleasant Pellets or a dose of castor oil.

**CORNS OR BUNIONS.** Caused by tight shoes, or callouses, should be treated with Dr. Pierce's Corn Plasters. Correct the misfitting shoes and bathe the feet frequently.

**CONSTIPATION.** That hideous and deathly demon of sickness—constipation, is an easy enough thing to cure if you will but persist in its proper treatment. Constipation is one of the commonest things in the world. It is really one of the most serious. The most common cause of constipation is irregular habits. There should be an established hour for evacuation, and it should never be put off. If delayed an hour or two, it may result in a whole day's delay. An occasional delay of this kind may bring on chronic constipation. The trouble with us nowadays is, that we do not lead natural lives. The men sit at their desks from morning until night—they have not the time to walk to business. The office man turns his desk into a dining-table, and "bolts" his food in ten minutes. The artisan often eats his lunch on the same bench where he works. Neither gets the out-of-door exercise he

needs. Very few women get enough out-of-door exercise. Very many get no exercise at all. Modes of dressing interfere with the proper muscular action and with the circulation of the blood. All hygienic laws are broken.

Nature works as hard as she can, but there are some things that she cannot stand. If a man gets some foreign substance into his watch, he doesn't expect the watch to run until the impediment is removed. His own digestive system is a much more wonderful and delicate mechanism than that of his watch, and yet he neglects it and abuses it. He lets it get out of order, and refuses to help it. In the end his neglect reacts with terrible force upon himself. The reaction comes on gradually, however, so that sometimes he scarcely suspects the cause.

### Terrible Results

Constipation is often thought to be a very little thing, yet when we say that over nine-tenths of all human sickness is due to this one thing, it begins to assume importance. When the sewage of a house is checked—when it backs up and sewer gas is generated—there is usually sickness in that house. It is the same with our body, which is the house we should be most careful of. When the course of the natural drainage tract in the human system is obstructed, decomposition generates poisonous gases and liquids which are carried all through the system—causing more or less of the following derangements: Jaundice, Torpid Liver, Billiousness, Sallow Skin, Indigestion, Foul Breath, Coated Tongue, Loss of Appetite, Pimples, Blotches, Hives, Eruptions, Boils, Dizziness, Headache, Coldness of Feet and Hands, "Heartburn" or "Water Brash," Wind on Stomach (flatulence), Belching Foul Gases, Disturbed Sleep, Nightmare, Drowsiness, Shortness of Breath, Cramps, Colic, Gnawing or Burning in Stomach, Great Mental Depression (despondency), Impoverty of Blood, Nervousness, Irritability, Neuralgia, Pain in Side, Backache, Piles, Irritable Bladder, High Colored Urine.

Besides being the direct cause of so many afflictions, it is also true that constipation is the indirect cause of many fevers and other dangerous diseases, because poisonous germs are not carried off, but remain to be taken into the circulation and the system. Neglect to heed the warning which occasional constipation gives, will result in chronic constipation, which is very difficult of cure.

## How to Cure Constipation.

Occasional constipation is easily rectified by taking one or two of Dr. Pierce's Pleasant Pellets on first rising in the morning. Try one "Pellet" first, and if this does not bring the desired action, take two, then three—but one or two is usually sufficient. For chronic Constipation we recommend a simple method of cure which is successful in over ninety-nine per cent. of all cases.

### Hygienic Rules.

First.—Rise from bed in the morning at a regular fixed hour.

Second.—Take a tumblerful of cold water (if suffering from indigestion take it hot) with one or two "Pleasant Pellets" immediately after getting up.

Third.—One-half hour later take breakfast (including oatmeal or fruit, Graham bread or corn bread) always at the same fixed hour.

Fourth.—Daily make an attempt at defecation at the same hour—say half an hour after breakfast.

Fifth.—Drink plentifully of water during the day, and also a small quantity with the food taken—it may be in the form of milk, coffee, or tea—but in all cases the food should be well masticated. Do not make the mistake of washing down the food half-chewed.

Sixth.—Kneading the bowels with the hands, massage, or rolling a good sized rubber ball filled with shot over the bowels will also help the peristaltic action in many cases.

Such a regular course of habits and treatment as above outlined, if persisted in, coupled with the judicious and somewhat protracted use of Dr. Pierce's Pleasant Pellets, will, in due time, correct this chronic difficulty.

### Food and Drink.

The reason we recommend the plentiful use of water is because in most cases of constipation the contents of the lower bowels become hard and dry—from absorption—so that the drinking of water will assist in moving them. As a rule people drink too little water. A great fault with the American people, who live most of their lives at high pressure, is that they hurry their food down.

More time should be given to meals, and the food should be chewed thoroughly. Thus the food presents a greater surface for

the solvent action of the digestive fluids. Unless an article of diet can be digested it is of no value, no matter how rich it may be in nutriment. A varied diet tempts the palate and stimulates digestion. Fruit and vegetables should not be lacking for healthful living. They contain a large percentage of water—water helps to dissolve the food and assist the peristaltic action of the bowels. The foods which tend to overcome constipation are Graham bread, brown bread, mush, cracked wheat, oatmeal, cornbread, potatoes, green corn, tomatoes, fresh and dried fruits. Coffee has a slightly laxative influence, while tea is constipating.

### **Exercise Necessary.**

Inactive life and sedentary occupations are most prolific causes of constipation. Active exercise helps to regulate the bowels, because the blood, the muscles and the whole system, get the necessary stimulation. The occupation of brain-workers causes an increased flow of blood to the head, drawing it from the extremities, and thus the circulation is deranged often causing congestion of the bowels. Girls at boarding schools, students, factory girls, seamstresses, milliners, employes in manufactories—all who sit and toil with exercise restricted to only a few sets of muscles, are often the victims of chronic constipation.

### **Common Sense Treatment.**

What is required is a remedy which is mild and will not derange the system. Calomel (mercury) is still in common use among physicians, but it is a dangerous weapon to employ, and that is the reason that Dr. Pierce always used, in his extensive practice, a physic compounded of May apple, leaves of aloe, root of jalap, made into sugar coated pills, called Dr. Pierce's Pleasant Pellets—the product of many years' study and experience.

### **How to Take the "Pellets."**

One "Pellet" is a mild laxative. Two give more noticeable results, and they may be continued until the system is thoroughly renovated, strengthened and put into harmony with Nature. One need not fear a "habit" of taking the "Pleasant Pellets"—you do not become a slave to their use, as with other pills. It is best to take one "Pellet" on the morning of the first day; if that does not act, then two on the next day, and if this refuses to empty the bowels freely, take a still larger dose the morning following. As soon as possible, the daily dose should be gradually reduced until

one "Pellet" is sufficient to bring a mild action, and then this can be omitted occasionally, to see if Nature will not take care of itself without assistance. It is then possible to skip every other day, or perhaps two days, without the use of the medicine. Be patient with a trouble which has probably been coming on for a long time—with a chronic trouble the cure is never sudden or rapid. Above all, acquire regular daily habits; do not neglect to try and empty the bowels each morning at the same hour of the day. The only persons who are not always susceptible to this treatment, if persisted in for a reasonable length of time, are very old people who may always have to depend on laxatives in some form, because this regularity of habit was not acquired early enough in life; and, in such rare cases, no better agent can be employed than the "Pellets." For all others the use of Dr. Pierce's Pleasant Pellets, together with regular habits and exercise, are sure to bring permanent results, if their use is persisted in for a sufficient length of time, and the foregoing rules and rational course of treatment are faithfully carried out.

**CONSUMPTION (Tuberculosis).** See page 425.

**COMPLEXION—Bad, Sallow, Blotchy.** A good complexion depends upon the blood. Pure blood will usually show a good complexion. A faulty digestion, indigestion, dyspepsia, is the cause of a sallow complexion or pimply face, as well as constipation and auto-intoxication. Follow advice same as in constipation, and for the heartburn, indigestion, dyspepsia and general stomach trouble, take Dr. Pierce's Golden Medical Discovery, or alterative extract.

**CONVULSIONS in Children.** Place child in warm bath. Little else can be done—but no need for alarm. Consult physician.

**CUTS.** It is not usually necessary to sew up a cut. If the cut is not sewed up at all the gash will fill up from the bottom and make a wider scar, but it is just as satisfactory in healing, although a cut sewed up very promptly and skillfully leaves a smaller, narrower scar. Treat a cut to stop the bleeding as described under "Bleeding, or Hemorrhage", page 405.

**DEAFNESS.** The middle ear, where most troubles arise, is often infected from the throat. The ear gets stopped up. Catarrhal deafness is the term used for disease of the ear which results

from a cold or catarrhal inflammation filling up the eustachian tubes. Sometimes the deafness, buzzing in the ear or earache can be helped by removing the wax with soap and warm water injections. Do not drive the water into the ear with force, but gently. Drop into the ear two or three drops of warm glycerine or sweet oil, leave there for half an hour, and then syringe out. In case of tube closure, the patient is given a glass of water to drink. Just as he swallows, the doctor blows the air forcibly up the nostrils; the air goes into the eustachian tube and opens it up and relieves that "stopped up" feeling that we often have from a cold, and lets air, which is very necessary, into the middle ear, back of the drum. Or, sometimes the tube can be opened if one holds the mouth and nose closed with a handkerchief and blows hard, puffing out the cheeks and making the face red.

**DIARRHEA.** Most often this is the result of some infection or some food which has irritated the intestines. It is the beginning of many diseases, such as typhoid fever. The appearance of blood in the discharge is not always serious. The intestines can stand a great deal of inflammation and a body can bear a great deal of this trouble. The main thing is to put very little in the stomach. Rest, warmth and starvation is the main treatment, but all irritating material in the bowels should be removed by castor oil or Dr. Pierce's Pleasant Pellets. Drink plenty of water, hot water is best. To relieve the pain and check the drain, take Dr. Pierce's Extract of Smart-Weed, or Water Pepper. This medicine contains Extract of Smart-Weed herb, Extract of Jamaica Ginger root, Jamaica Dogwood, Wild Yam and a small amount of Gum Camphor.

**DIABETES** ("wasting"—"sugar in urine"). We know not its cause,—but the disease manifests itself by sugar in the urine. The symptoms are thirst, voracious hunger and notwithstanding great quantities of food eaten, the victim continues to get thin. It is one of the frequent causes of death. A test of the urine tells the story. But fat old people, or middle aged people, often live for many years if proper care and treatment be taken. Write the faculty of the Invalids' Hotel and Surgical Institute in Buffalo, N.Y., for free advice and for a diet list.

**DIPHTHERIA** is one of the most contagious diseases—and of great mortality, if not recognized the first day. Early treatment by competent physician with diphtheria serum will usually cure.

**DYSENTERY** is the term generally used in cases where

there is blood, but we can have blood in mild or in severe cases. Treat as in diarrheal attacks. (See page 412.)

**DYSPEPSIA, Indigestion or Weak Digestion,** is most often associated with constipation. Obstruction in the bowels disturbs the stomach and leads to the usual symptoms of dyspepsia and to vomiting. Many chronic diseases of the kidneys produce dyspepsia. Many diseases of the blood, including all the anæmias, show themselves chiefly, as a rule, by stomach trouble and general weakness. The constipation should be treated with occasional doses of castor oil or Dr. Pierce's Pleasant Pellets. The sufferer should diet, and by writing the Invalids' Hotel and Surgical Institute, Buffalo N. Y., can receive free medical advice and a diet list, which should be followed. To correct most cases of dyspepsia, Dr. Pierce's Golden Medical Discovery will give tone to the blood, assist the assimilation of food in the stomach and correct the liver trouble. If kidney trouble is suspected, which produces dyspepsia sometimes, a sample of the water should be sent to the chemist of the Invalids' Hotel and Surgical Institute, to find out whether the kidneys are to blame. An analysis will be made free of charge, and if the kidneys are affected, in most cases Anuric Tablets, which can be obtained at most drug stores, will be of benefit. In cases of chronic Bright's Disease, of course, little can be done.

**DROPSY** (due to kidneys—see page 416.)

**EAR, Diseases of** (See Deafness, page 411.) —

**ECZEMA.** Eczema is very often due to the eating of some article of food. Diet is advisable. Take Golden Medical Discovery for improving the condition of the stomach and blood.

**FEVERS.** There are three long, steady fevers, namely, Typhoid, Tuberculosis and Sepsis. A good nurse can do much by feeding a patient who does not want to take food. Good care of his mouth, by bathing him skilfully and frequently, by encouraging him, and by keeping the bed in proper condition so that bed-sores do not form.

**FAINTING SPELLS** are likely to occur in hysterical women, and Dr. Janet says, they are, in fact, a strange sort of *forgetfulness*. A woman who is a sufferer can get great benefit by taking long walks in the open air, and that dependable woman's tonic, Favorite Prescription, to be had in all drug stores in tablet or liquid form.

**FITS.** Nobody can stop a fit or cure it. Usually the person comes out of it without any harm.

**GALL STONE COLIC.** The pain is usually at the pit of the stomach, not over the liver. It is very severe and usually comes on in the night, waking the person from sleep. It may require morphine to be given with great care by a physician. The colic is apt to be followed by chills, fever, jaundice and vomiting. Biliary Colic, or gall stones, causes so much pain that people often "double up." Operation is often necessary because stone may lead to more serious results. This operation is successfully accomplished at the Invalids' Hotel and Surgical Institute, Buffalo, N. Y.

**GOITRE** is a disease of the thyroid gland. Treatment with the X-ray will usually help, and the person gets better; as a last resort—operation. Successful results have been obtained by the use of the X-rays at the Invalids' Hotel and Surgical Institute, Buffalo, N. Y.

**GOUT** is a rare disease in America. It usually attacks the big toe with furious pain at night, easing up the next day. Treat with "Anuric," which can be obtained at most drug stores, taking about four tablets before going to bed, and two after meals.

**HAY FEVER.** A disease closely related to Asthma (see page 403). Some people get it from feathers, the pollen of flowers or weeds. It is very distressing but not dangerous. Change of climate and pure air will often prevent the paroxysm of short breath with wheezing and cough. It occurs most often in people whose systems are full of uric acid. Therefore the best way is to take Pleasant Pellets for the liver and "Anuric" (anti-uric-acid) tablets to remove uric acid from the system. "Anuric" can be obtained at most drug stores, or send 65 cents to Invalids' Hotel and Surgical Institute in Buffalo, N. Y.

**HEART.** Heart disease is the "champion man-killer" these days. Strange to say, in heart disease seldom does the patient experience pain. The pain in the left side, over the heart, that everybody experiences at one time or another is due to gas caused by faulty digestion, constipation (see dyspepsia, page 413, or neuralgia, page 420). The most common symptoms of heart disease are shortness of breath, due to poor circulation, and swelling of the legs (dropsy), because the heart, which is the circulatory pump of the body, does not circulate the blood from the extremities. Later

a person is not able to lie down at night because he cannot breathe, and with it comes a cough. The sufferer should consult a good physician, or if possible, the Specialists at the Invalids' Hotel and Surgical Institute in Buffalo, N. Y.

**HEMORRHAGE.** (See page 405, under Bleeding.)

**HEMORRHOIDS, or Piles.** Usually the result of constipation (see page 407). Treat the constipation and keep the piles within the body. Obtain at the drug store a box of Dr. Pierce's Pile Ointment and apply; or consult the Specialists of the Faculty of the Invalids' Hotel and Surgical Institute, Buffalo, N. Y. Such consultation is free, whether by mail or consulting the doctor in person. Send for free booklet.

**HERNIA, or Rupture.** Due to a weak spot in the muscular wall, and gradually enlarges with age. In mild cases hernia can be held back with a truss. Usually a painless operation is the safest and only permanent relief. Send for free booklet, treating of Rupture, to the Faculty of the Invalids' Hotel and Surgical Institute, Buffalo, N. Y.

**HIVES (Urticaria, or "Nettlerash").** Due to a peculiar sensitiveness to certain substances, as in Hay Fever (page 414). We have known people to "break out" with Hives from eating strawberries or lobsters, shell fish, eggs, buckwheat, rye, oatmeal. The same kind of food seldom affects two persons alike. It is called the idiosyncrasy of that person for a certain food. Overheating or over-exertion in hot weather, coupled with over-eating, will sometimes cause hives. Remedy: Proper food; take a good physic, or laxative, such as castor oil or Dr. Pierce's Pleasant Pellets. To relieve the itching take alkaline baths or sponge with alcohol or vinegar.

**"HOT-FLASHES."** (See Menopause, page 419.)

**HOOK-WORM.** In Southern states where frequently young or old walk bare foot, they often get "ground itch"—an irritation between the toes. Then the hook-worm gets through the skin into the blood and poisons the body. Such persons become anæmic. Take a dose of thymol, or write the Faculty of the Invalids' Hotel and Surgical Institute in Buffalo, N. Y., for free medical advice.

**INFANTILE PARALYSIS (Spinal paralysis in children).** A germ disease which begins with a fever and often with

brain symptoms. Paralysis often affects one leg. Many recover without paralysis, but when that occurs the child seldom gets well.

**INSOMNIA (Sleeplessness).** Often due to worry, too great nervous strain, indigestion (see page 413, under *Dyspepsia*). If bedroom is "stuffy" sleep outdoors. Get plenty of outdoor exercise. Avoid fear, anger, excitement. Read "Happiness," as found in "Forethought minus Fear-thought," by Horace Fletcher. The hardest work should be done in the morning. To prolong sleep after daylight place a black stocking over the eyes. Sometimes a cracker or milk or warm water at bedtime will help to induce sleep.

**INVALIDISM in Women.** Chronic invalidism in women following marriage, with dragging pain and fever, can often be relieved by treatment with a tonic, such as Dr. Pierce's Favorite Prescription, and rest in bed. Consult the Faculty of the Invalids' Hotel in Buffalo, N. Y., and get free medical advice.

**ITCH (Scabies).** Due to a little beetle which burrows into the skin, usually between the fingers.

**IVY POISON.** Scrub the skin often with a pure soap, or Dr. Pierce's Medicinal Soap, when first poisoned, and then again and again. After each wash apply Dr. Pierce's Mentha-Soothaline.

**JAUNDICE** is a yellow staining of the eye and skin by bile in the blood and finally in the urine. It often occurs in fat elderly women, and is due to gall stones (see page 414), in the cystic, hepatic, or common duct leading to the gall bladder. The treatment is surgery, and most successful operations are performed at the Invalids' Hotel and Surgical Institute in Buffalo, N. Y.

**KIDNEYS.** Two kidneys, each as large a mass as your fist, perform the duties of removing poisons from the blood from birth to old age. Death results in a few hours if the kidney cells do not remove the waste materials and fail to perform their function. There are numerous symptoms of disease of the kidneys. In no case are all these symptoms felt at one time; a few are usually present in the average case. Often they disappear only to recur. Some of the symptoms are as follows: Dragging pain in the small of the back and hips, pain in the ribs and belly, nervous breakdown, low spirits, worry; scantiness or suppression of the urine, which may contain blood, albumin or casts; weakness, headache, sleeplessness, shortness of breath, twitching of muscles; nervous

excitement from poison in blood; pain in back of neck; paralysis, hemiplegia (paralysis of half the body), aphasia, loss of speech or inability to remember or speak certain words; foul breath; swelling of the limbs or under the eyes; redness of face; dropsy; anæmia, thinness of the blood; urinary changes, dizziness; moderate back-ache; tenderness on deep pressure over the kidneys; loss of flesh and strength. Appetite poor. Renal colic; sharp pain in back and side. The patient is suddenly seized with pain of agonizing character, having its origin in lumbar region, front or back. Renal calculus may be present for years. The finding of a tender, fluctuating mass in the space between the last rib and the crest of the ilium (top of the hip bone). Gout, rheumatic pains or neuralgia, irritability, despondency, weakness and general misery.

Persons suffering from any one of the symptoms given above should at once have their urine thoroughly examined by chemical analysis, as such an analysis will tell what is the matter with the kidneys. Just as a test of the water is one of the most important tests that an examiner for life insurance will take, so it is important to every person to have a test made of the water once a year to find out if any danger lurks in the kidneys. Some physicians are very expert at these tests, and we advise every one to have this done either at home or send a bottle of his or her water, carefully packed, to the chemist of the Invalids' Hotel and Surgical Institute, Buffalo, N. Y., where there is a special laboratory for this work conducted by an experienced chemist and assistants. At the same time write a letter, and state your symptoms, if any, and a careful examination will be made free of charge and a report made to you without cost.

**BRIGHT'S DISEASE** is the most frequent disease of kidney, and the most serious, often accompanied by swelling of the whole body (dropsy). Dropsy is removed by taking a purgative, such as Dr. Pierce's Pleasant Pellets, to draw water out of the tissues, also sweating as in a hot bath. Little can be done for Bright's Disease. Therefore everyone should be careful to prevent the disease by having the urine examined at least once a year. Most people do not drink enough pure water. If uric acid accumulates within the body, and they suffer from headache, pain here or there, too frequent urination especially at night, and water passes with a burning sensation—these and many other symptoms frequently mean that the kidneys are at fault, they need

assistance, and the best tonic for the kidneys which will assist them to eliminate the waste and get rid of the poisons is a harmless but effective remedy, called "Anuric" (anti-uric-acid), first discovered and used by Dr. Pierce and his associate physicians at the Invalids' Hotel and Surgical Institute in Buffalo, N. Y. The important ingredients are: Ammonia Salicylate, Extract Apocynum, Potassium Citrate, Cinchonine Sulphate, Potassium Iodide, Extract Buchu, and Compound Extract of Colocynth. "Anuric" can usually be obtained at most drug stores, or by sending 65 cents to the Invalids' Hotel in Buffalo, N. Y., it can be readily obtained.

**LAXATIVES.** Medicines used for constipation. (See p. 409.)

**THE LIVER.** (See page 408, under constipation.)

**LUMBAGO and Stiff Neck** are sometimes the effect of catching cold, and the cold settling in the muscles of back or neck. Some persons are particularly prone to these troubles because their systems are full of uric acid and the urate salts are deposited in the sheaths of the muscles in such places as the back or the neck. Uric acid accumulates in over-abundance within the system because the kidneys and liver do not throw off this poison in sufficient quantities. The easiest way to get rid of this over-abundance of uric acid is to stimulate the kidneys into activity by taking Anuric, which can be obtained at any drug store, or by sending 65 cents to Invalids' Hotel and Surgical Institute in Buffalo, N. Y. Occasionally one should also take a laxative, such as Dr. Pierce's Pleasant Pellets or castor oil. Taken in conjunction, the Pleasant Pellets and the "Anuric" will usually throw off the poisons which caused the backache or stiff neck.

**MALARIA.** Malaria, which is often ushered in with "chills and fever," is frequent in many places in the United States, and the most important precaution which a healthy individual can take is to take small doses of quinine all the time. Malaria is carried by the mosquito, and introduced into the blood of the victim by the bite of a malarial mosquito. For those suffering from malaria, nothing is better than Dr. Pierce's Chill-Tonic Tablets. Send 65 cents to Invalids' Hotel, Buffalo, N. Y.

**MEASLES.** Recognized by the spotted pimply rash, usually seen first on the chest. A common disease of children, which runs its course, and needs only good care and nursing. Treat with baths. Give the child water or cracked ice in mouth. Have good air in bedroom. Measles is sometimes followed by tuberculosis (consumption) because after this fever resistance

is weakened and the child takes in the tubercle bacillus (germ) and it finds a fertile field.

**MENOPAUSE.** Women near the fiftieth year or earlier, suffer from "hot flashes," due to changes of circulation. There is no reason to fear at such times as the process is natural. Sometimes a tonic for women is of great assistance, such as is composed of Lady's Slipper, Black and Blue Cohosh, Unicorn Root, Oregon grape root, Viburnum, and was made up in ready-to-use form nearly fifty years ago and sold as the "Favorite Prescription" of Dr. Pierce. It can now be obtained in tablets or liquid at most drug stores.

**MENSTRUATION.** Some women feel no depression and no need to take different care of themselves than ordinarily. Some have to go to bed for a day or more. The great majority of women do best by taking less exercise and doing less work on the first day. It is a false idea to keep too quiet and think of their pains. Anything to divert the mind at this time is better than giving up to the thoughts of sickness. Some girls, through catching cold, or through some functional disturbance, suffer great pain at monthly periods. Such girls should take a tonic such as was prescribed by Dr. Pierce many years ago, and has since been sold in every drug store in the land. It is composed of the ingredients given in preceding paragraph. In tablet or liquid form.

**NASAL CATARRH.** In consequence of repeated attacks of acute catarrh, or "cold in the head" as it is usually termed, the mucous membranes of the nose and the air-passages of the head become thickened, the mucous follicles or glands diseased, and their functions either destroyed or very much deranged.

Dr. Sage's Catarrh Remedy, which is made of Menthol, Resorcin, Carbolic Acid, Berberis Aquifolium, Salt, coloring matter (trace), treats this condition on common-sense, rational and scientific principles, by its mild, soothing, and healing properties, to which the disease gradually yields, after the system has been put in perfect order by the use of Dr. Pierce's Golden Medical Discovery and Dr. Pierce's Pleasant Pellets.

**NERVOUS SYSTEM, Diseases of the.** Almost any one, if run down, as a result of any disease of any organ, may be neurasthenic. Hard work seldom causes any nervous disease. It may be a person is run down, is pale, anæmic, usually because confined to house, workshop, office or store. He has not had good air to breathe, therefore the blood has not been

charged with sufficient oxygen and the nerves have not been fed on good rich blood.

**THE NEURASTHENIC TYPE** means weakness of the nerves. Very often, strange as it may seem, hard work will cure such cases. The hysteric type, also, is more often found in women. In either case the blood may require a tonic, inasmuch as the nerves are fed by the blood.

**NEURITIS** is generally due to alcohol or other poison. The alcohol circulating in the blood gets hold of the nerve fibers and degenerates them, then there is weakness and paralysis, chiefly of the legs, often with pain and numbness and sometimes with swelling.

**NEURALGIA.** The difference between neuralgia and neuritis can be easily made through electrical tests. Neuralgia has often been called "the cry of starved nerves for food." In this case the food must be good blood. When the blood gets thin, "watery," and the person is said to be anæmic or bloodless, when for any reason the blood has deteriorated, he very often suffers from neuralgia, or pains of the nerve endings. There is inflammation of the sheaths of the nerves due to irritant poisons that should be thrown out.

Practise hygiene and take a tonic for the blood in order to purify it and feed the nerves on good fresh, red blood. Such a tonic is made from Oregon grape root, Blood root, Stone root, Queen's root, Cherry bark, Sacred bark, scientifically put together by Dr. Pierce years ago and now sold by all druggists in tablets or liquid as "Golden Medical Discovery."

**NOSEBLEED.** When you have nosebleed, do not bend forward over a basin; that compresses the veins at the base of your neck and keeps more blood in the head. The person should lie down on his back. A certain amount of blood will go down into the stomach but that does not harm. Keep quiet. If bleeding persists the nose may be stopped up by pressure and gauze, stuffing gauze up the nostrils, putting it in place with a pencil.

**OVARIAN DISEASE.** When a woman has ovarian tumor the only cure is by operation. Such a tumor does not mean cancer, nor is there any serious danger to life when properly operated. Many tumors of this kind are successfully removed by the surgeon and specialist at the Invalids' Hotel and Surgical Institute, in Buffalo, N. Y.

**PARESIS.** This is very common, sometimes called "softening of the brain," due to syphilitic disease. In early stages, and sometimes later, it is greatly helped by Salvarsan. If these cases could only be treated early, the injection of Salvarsan would abort the progress of the disease. Patients suffering from paresis in the early stages show a change in behavior and temperament. They become lazy and are no longer neat in their dress. They complain of being nervous, and want something for their nerves. They are unable to do ordinary addition or simple problems of arithmetic. Sooner or later, they become unconscious in the street with or without convulsions. Such persons later become suddenly great spenders, and believe they are rich, handsome or clever. Tests of the blood will prove whether the patient is paretic. The Wasserman test being the most used.

Specialists at the Invalids' Hotel and Surgical Institute, at Buffalo, N. Y., have found that unless this disease is treated early it goes on to a paralyzed condition, but they have had great success with injections of Salvarsan into the spinal column.

**PERIODS, MONTHLY.** (See Menstruation, page 419.)

**PILES.** (See Hemorrhoids, page 415.)

**PIN WORMS** are about an inch long, very minute, thread-like creatures which settle down into the lowest part of the bowel, cause itching with local irritation, especially in children. These can be easily expelled by the use of enemas of fluid strained after three hours soaking of a teaspoonful of quassia chips in a pint of water. Afterwards grease external parts well.

**PNEUMONIA.** This is due to a germ and the disease runs for about ten days. A person needs good nursing and fresh air, and that is about all. Outdoor treatment in children is very helpful. In the case of a person who is accustomed to drinking alcohol, pneumonia is very serious, such a person being much more apt to die than the person who does not use alcoholic drinks.

**PROSTATE GLAND, Enlargement of.** This trouble stops the flow of urine or obstructs its flow, and is very common in elderly men. This swelling in the outlet of the urethra stretches and thickens the bladder, causes continuous pressure upon the kidneys, and the kidneys do not functionate. A sufferer has to make water day and night. Finally, the water has to be drawn with a catheter. A mild operation is successfully done at the Invalids' Hotel and Surgical Institute,

Buffalo, by a specialist who treats many older men for this trouble every day. The operation has been performed an enormous number of times with very general relief and uniform success.

**QUINSY** sore-throat is a type of tonsilitis that produces an abscess. Nowadays, we believe in taking out the tonsils, when the person shows signs of trouble in the joints or when he has repeated attacks of tonsilitis.

**RHEUMATISM** is usually due to a storing up of the uric acid in the system, and in consequence urate salts are deposited in the muscles or the joints; or, it is due to a germ, the streptococcus, which is introduced into the system, first, through disease of the tonsils, or tonsilitis. This germ (streptococcus) is carried by the blood to the joints, causing acute rheumatism, or to the heart or the brain. Thus many poisons that should be carried off by the kidneys or bowels accumulate and produce pain or soreness of the muscles.

In these conditions, first, effort should be made to remove the poisonous materials, and the bowels and the kidneys should be made more active. The bowels must be kept loose with the use of one or two of Dr. Pierce's Pellets with each meal for several days. For the kidneys, Anuric tablets should be taken with a glass of water after meals. In severe cases of pain we would recommend Anuric Tablets in doses of two or three every two or three hours. Take plenty of water and fruit, such as apples.

Diet has much to do with rheumatic conditions, and we advise patients who suffer from these maladies to live mainly on foods that do not contain substances likely to produce highly acid and acrid poisons in the blood. Get about in the open air as much as possible. Follow a diet list which can be obtained free by writing the Faculty of the Invalids' Hotel and Surgical Institute, Buffalo, N. Y. No charge whatever for consultation.

**ST. VITUS' DANCE, or Chorea**, is a germ disease, due to the same streptococcus which produces rheumatism, tonsilitis in children. It usually occurs between five and eighteen years of age. The child makes restless motion of the hands, face or feet, is "fidgety." Should not be treated with medicines. The child should be taken out of school, and in severe cases kept quiet in bed. A child will usually outgrow the trouble.

**SCARLET FEVER, MEASLES and CHICKEN-POX** are children's diseases which break out with a rash on the skin.

In the case of scarlet fever there is sore throat, as well as a red rash. The rash, which is accompanied by the fever, after a little while becomes a continuous red flush, not spotted, like measles. Then the child begins to peel, when the active stages of the fever are past. The most contagious time is the early stage of the disease. The "peeling" period is the least dangerous. Good nursing is the most important part of taking care of a child with scarlet fever. The most a doctor can do is to treat such complications as often follow the disease, such as kidney trouble, or ear trouble, or heart trouble.

**SHINGLES** is a disease that shows itself along the side of the chest with water blisters and sores, sometimes follows neuralgia, and is often met with in elderly people. Same treatment as in neuralgia. (See page 420.)

**SICK-HEADACHE, or "Migraine"** is a painful affliction which is often inherited, and is apt to come about at particular periods. With women it is likely to come at the "period." It is frequently felt on one side of the head. Sooner or later the sufferer is sick at the stomach, and is apt to vomit. Physic, glasses for eye-strain, removal of bad teeth, are helpful. Walking in the fresh air every day helps to prevent attacks. The trouble is more common to women than to men. It is sometimes relieved by using five or ten grains of asperin. A periodical sufferer should study hygiene, as given in another chapter, and should see that the liver and bowels are kept active with castor oil, or Dr. Pierce's Pleasant Pellets, or an occasional enema.

**SKIN, Diseases of.** The different diseases of the skin can only be recognized by a physician who makes them his particular study, such as the specialist in skin diseases at the Invalids' Hotel and Surgical Institute, Buffalo, N. Y. (For Eczema see page 413. Acne (or pimples) see page 401. Boils, see page 405.)

**SPRAINS.** For a severe sprain quickly apply cold water, ice, or cold packs or hot packs. Then put the arm or the leg lengthwise on a pillow, fold the side of the pillow over and pin them with safety pins across the top. All that any physician can do with a bad sprain is to have it examined with an X-ray for fracture, then give rest and support to joint.

**STIFF-NECK** is usually due to catching cold. The urate salts are deposited in the muscles of the neck, and the same treatment as in lumbago, page 418, should be used. Get rid

of the excess uric acid by flushing the kidneys. Take Anuric after meals. Drink plenty of water. And remove the poisons also, by taking a good laxative such as castor oil or Dr. Pierce's Pleasant Pellets.

**STOMACH.** Doubtless the cause of stomach complaint is weakness. Very few people ever have cancer or ulcer of the stomach. It is best not to use pepsins or remedies which are advertised to aid digestion, inasmuch as resort to such artificial means does not help the stomach to take care of itself. Many diseases of the blood, including anæmia, show themselves chiefly, as a rule, by stomach trouble and general weakness.

A good blood tonic that will give tone to the stomach, stimulate the liver into healthier action, is a prescription made up of Blood root, Oregon grape root, Stone root, Queen's root, Sacred bark and Cherry bark, made into tablets or liquid, and sold in every drug store as Dr. Pierce's Golden Medical Discovery.

**SUN-STROKE.** If a person has been working in the sun, and falls unconscious, and if his temperature is found to be 106 degrees or more, it is pretty certain to be sunstroke. The treatment is to bring the temperature down or the body will "burn up." The way to do that is to use ice. The patient should be stripped and rubbed with ice. If two people are at hand, they can work over the sufferer with blocks of ice—one at the upper part of the body and the other at the lower. Keep a cold towel or ice-bag on the head. When the temperature gets down to about 101, stop the ice and the cooling process. The person usually recovers nicely within a few days, and has no permanent bad effects.

**SYPHILIS.** Syphilis can be made to disappear, but it takes long treatment to get rid of it. The physician depends upon the Wasserman test to tell whether the patient is afflicted with the disease or not. The Specialists at the Invalids' Hotel and Surgical Institute, Buffalo, N. Y., treat many persons with this disease. Injections of Salvarsan are given, but this must be done by a physician who takes great care, and who has had great experience in the treatment. The term "606" means the same thing as Salvarsan. To give Salvarsan, or "606", is a delicate process. It takes a skillful physician for a considerable time to do it right. Salvarsan must be given from five to ten times, with intervals.

**TAPE-WORM.** The patient usually discovers the worm in discharges from the bowels. The specialists of the Invalids'

Hotel and Surgical Institute, Buffalo, give medicine which is distasteful to the worm and it lets go of the intestine. Then a purgative is taken to drive it out. This may take 48 hours.

**TUBERCULOSIS (Consumption).** Whenever any one is suspected of having tuberculosis, or consumption, an X-ray test should be made. Tuberculosis of the lungs or of the bones is greatly benefited by sunshine and outdoor air. The patient should have rest, outdoor air, nourishing food and sunshine. It is not the heat of the sun, but something in its chemical action that kills the tubercle bacilli, and encourages sound tissue. If one can afford to move to mountain air, or dry air as Arizona, Colorado, New Mexico, he can often recover from the disease and live a long and useful life.

**TONSILITIS**, or inflammation of the little gland at the beginning of the throat, just back of the tongue, on each side. It is often the beginning of diseases of the heart, kidneys and the joints. Thus rheumatism or Bright's disease often starts with tonsilitis. A germ, called the streptococcus, gives the septic sore throat of tonsilitis. Then the same germ is carried by the blood from the throat to the joints, causing rheumatism, or to the heart or the kidneys. Resembles a very bad cold and very often weakens a person as much as an attack of pneumonia. Most physicians nowadays believe in taking out the tonsils, when a person has repeated attacks of tonsilitis. Spraying the tonsils or gargling gives temporary relief. The bowels should be kept open by castor oil or Dr. Pierce's Pleasant Pellets. The kidneys should be kept free by drinking plenty of hot water, and taking a couple of tablets of Anuric three times a day.

**TYPHOID FEVER** is caused by germs in milk or water. The fever of typhoid patients runs a course of about four weeks. Most physicians send sample of blood to some state or city laboratory for the "Widal" test. Vaccination will prevent it. Good nursing is most important. Care of the mouth, frequent baths, and keeping the patient in the best possible condition. A competent nurse may save life. Nine persons out of ten will get well if they receive the proper nursing.

**URINARY ORGANS.** (See Kidneys, page 416.)

**THE URINE.** An examination of the urine with chemical and microscopical tests is something which all life insurance companies insist upon in their examination of the body before they will take the risk of insuring lives. It is very important to have the urine tested at least once a year. A thorough test

of the water will often prove whether the body is healthy or diseased. All the blood in the body goes through the kidneys within a few minutes, so that the kidneys take out of the blood most of the waste substances or poisons. Those substances which the kidneys take out of the blood constitute urine. A test of the urine will tell whether a person is a sufferer from Bright's disease, diabetes or other diseases, and is very valuable.

**UTERUS.** Displacement of the uterus, prolapse, fibroid tumor. Read all about these in Chapter XIV.

**VARICOCELE.** A varicocele is a sac in which distended veins are enveloped, these distended veins appear in the groin and near the testicle, causing more or less pain there, and often impotency. Specialists at the Invalids' Hotel and Surgical Institute, at Buffalo, N. Y., treat many thousands of such cases. Write to them for a free book, treating of varicocele, its causes and treatment.

**VARICOSE VEINS.** The veins inflame and stretch, become dilated, and very often cause a chronic ulcer, called "varicose ulcer." If these veins are cut out, another set takes up the blood, and a person has a better circulation than before. Some comfort can be derived from flannel bandages wound from below upward and by keeping the feet on a high pillow or higher place.

**WHOOPIING COUGH** is caused by a bacillus, or germ. Any one who has seen a few cases can easily distinguish it. The peculiar sound caused by inspiration ("breathing-in") after coughing is easily recognized. A child coughs and coughs and coughs until he is blue in the face, often vomits, and is relieved. In rare cases, children do not get any better until they are taken to the mountains or the seashore. Write for free advice and describe the case to The Faculty of The Invalids' Hotel in Buffalo, N. Y.

## POISONS AND THEIR ANTIDOTES.

POISONS.	ANTIDOTES.
<b>ACIDS.</b>	
<i>Acetic Acid.</i> <i>Citric Acid.</i> <i>Muriatic Acid.</i> <i>Tartaric Acid.</i>	Alkalies—carbonate of soda and potash—also lime and magnesia are antidotes to these poisons. As soon as the acid is neutralized, mucilaginous teas, such as flax-seed, gum arabic, or slippery-elm, may be given.
<i>Sulphuric Acid</i> ( <i>Oil of Vitriol</i> ).	Soap, in solution, or magnesia will counteract its influence. Water should <i>not</i> be given as it causes great heat when mixed with this acid.
<i>Nitric Acid</i> ( <i>Aqua Fortis</i> ) <i>Oxalic Acid.</i>	Lime-water, carbonates of lime and magnesia in solution, are the only antidotes. Give mucilaginous drinks.
<i>Carbolic Acid.</i>	There is no special antidote, except alcohol. Oil, glycerine, milk, flour and water, whites of eggs, magnesia, and flax-seed tea may be used.
<i>Prussic Acid.</i> <i>Laurel Water.</i> <i>Oil of Bitter Almonds.</i>	Ammonia, by inhalation or in solution, may be used. Apply a cold <i>douche</i> to the head.
These agents are speedily fatal.	
<b>ALKALIES.</b>	
<i>Liquor of Ammonia.</i> <i>Water of Ammonia.</i> <i>Muriate of Ammonia.</i>	Vegetable acids, such as vinegar, lemon-juice, citric and tartaric acids, neutralize this poison.
<i>Liquor of Potassa.</i> <i>Nitrate of Potassa</i> ( <i>Saltpetre</i> ). <i>Carbonate of Potassa</i> ( <i>Pearlash</i> ). <i>Salts of Tartar.</i>	All the fixed oils, such as linseed, castor and sweet oil, also almonds and melted lard, destroy the caustic effects of these poisons. Mucilaginous drinks may be given.

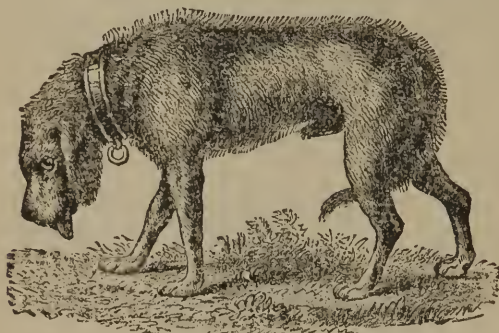
POISONS.	ANTIDOTES.
<p>IODINE.</p> <p><i>In its different forms.</i></p>	<p>Starch, wheat flour mixed with water, whites of eggs, milk, and mucilaginous drinks are excellent antidotes.</p>
<p>VOLATILE OILS AND AGENTS.</p> <p><i>Creosote</i>  <i>(Oil of Smoke).</i>  <i>Oil of Tur.</i>  <i>Oil of Turpentine.</i></p>	<p>The same antidotes as in case of poisoning with iodine may be used in this, or the stomach may be evacuated with an emetic or a stomach-pump.</p>
<p>ALCOHOL.</p>	<p>A powerful emetic of white vitriol or mustard should be given at once, cold should be applied to the head, and the extremities vigorously rubbed.</p>
<p>ANTIMONY AND ITS COMPOUNDS.</p> <p><i>Tartar Emetic.</i>  <i>Butter of Antimony.</i>  <i>Oxide of Antimony.</i></p>	<p>If vomiting has not occurred, induce it by tickling the throat and giving large draughts of warm water, after which administer astringents, such as infusions of galls, oak-bark, Peruvian bark, or strong green tea.</p>
<p>ARSENIC AND ITS COMPOUNDS.</p> <p><i>White Arsenic.</i>  <i>Yellow Sulphuret of Arsenic.</i>  <i>Red Sulphuret of Arsenic.</i>  <i>King's Yellow.</i>  <i>Fly Powder.</i>  <i>Arsenical Paste.</i>  <i>Arsenical Soap.</i>  <i>Scheele's Green.</i>  <i>Paris Green.</i></p>	<p>Oils, or fats, lard, melted butter, or milk should be given, then induce vomiting with sulphate of zinc, sulphate of copper or mustard; fine powdered iron rust or magnesia may be given every five or ten minutes. Mucilaginous drinks should be given as soon as the stomach is evacuated.</p>
<p>COPPER AND ITS COMPOUNDS.</p> <p><i>Blue Vitriol.</i>  <i>Verdigris.</i></p>	<p><i>Avoid the use of vinegar.</i> Give albuminous substances, such as milk, whites of eggs, wheat flour in water, or magnesia; yellow prussiate of potash in solution may also be given freely,</p>

POISONS.	ANTIDOTES.
<p>LEAD AND ITS COMPOUNDS.</p> <p><i>Acetate of Lead</i> (<i>Sugar of Lead</i>). <i>White Lead</i>. <i>Red Lead</i>. <i>Litharge</i>.</p>	<p>In lead, or painters' colic, purgatives and anodynes may be given, together with large doses of iodide of potassium. Give a strong cathartic, as there is always marked constipation.</p>
<p>MERCURY AND ITS COMPOUNDS.</p> <p><i>Corrosive Sublimate</i>. <i>White Precipitate</i>. <i>Red Precipitate</i>. <i>Calomel</i>.</p>	<p>Albumen in some form should be given; if the poison is not absorbed, follow with a mustard or Tartar emetic.</p>
<p>ACRONARCOTICS.</p> <p><i>Ergot</i>. <i>Black Hellebore</i>. <i>Veratrum Viride</i> (<i>American Hellebore</i>). <i>Aconite</i>. <i>Fox-glove</i>. <i>Gelseminum</i>.</p> <p><i>Belladonna</i>. <i>Stramonium</i>.</p> <p><i>Nux Vomica</i>. <i>Strychnia</i>.</p> <p><i>Poison Oak</i>. <i>Poison Vine</i>.</p>	<p>The general treatment indicated for this class of poisons, is to evacuate the stomach with a stomach-pump or an emetic composed of fifteen or twenty grains of sulphate of zinc or copper, or large doses of mustard, repeated every quarter of an hour until the full effect is produced.</p> <p>Morphine, sassafras, iodine, and stimulants.</p> <p>Large doses of camphor, chloroform, and tobacco, may all be beneficial.</p> <p>Muriate of ammonia, in solution, may be applied externally, and from ten to fifteen grains given internally; soda is also useful.</p>
<p>NARCOTICS.</p> <p><i>White Henbane</i>. <i>Opium</i>.</p>	<p>Sassafras may be used as an antidote for henbane. Belladonna is an antidote of opium; cold water should also be applied to the head of the patient, and the extremities should be well rubbed. Patient should drink a large quantity of strong, black coffee.</p>
<p>ANIMAL POISONS.</p> <p><i>Spanish Fly</i>. <i>Potato Fly</i>.</p>	<p>Excite vomiting by drinking sweet oil. Sugar and water, milk, or linseed tea in large quantities, and emollient injections are valuable.</p>

## DOG BITES. (HYDROPHOBIA.)

EVIDENCES OF THE DISEASE—HOW TO TREAT THE AFFLICTED.

This dreaded disease results from the bite of an infected animal—the dog, cat, wolf, fox, etc. Ninety per cent. of all cases in human beings result from the bite of the dog, four per cent. from cats and wolves and two per cent. from foxes. The specific germs or poison is introduced by the tooth or teeth making the puncture in the flesh and affects the brain prin-



DOG IN THE FIRST STAGE OF HYDROPHOBIA.

cipally. The accompanying illustrations cannot fail to make so strong an impression upon the mind that the mad dog will be known at first sight.

Very few physicians outside of large cities have an opportunity to see or study cases of this kind. Lately we read a report on the subject by the President of the Board of Health of New York which is so comprehensive and practical that we copy some paragraphs for the instruction of our readers.

“A practical point of great importance in connection with hydrophobia is to determine whether the animal which has inflicted the wound is or is not mad. If it is killed this may be determined within a very few minutes by a microscopic examination of the dog’s brain. This brilliant discovery was made in 1903 by an Italian physician, Dr. A. Negri, who demonstrated the presence of certain specific bodies in the brains of animals suffering from rabies. This knowledge obtained within

a few hours after the infliction of the bite should enable any competent physician to treat the wound in such a way as to prevent systemic infection. If a competent pathologist is not close at hand to make the examination, the skull of the animal should be broken open, the brain removed and placed in a jar or bottle filled with a mixture of one-half water and one-half alcohol, and this should be forwarded at once to the nearest laboratory, where the examination can be made within five minutes after it is in the hands of the pathologist and a positive assurance made as to whether the animal was or was not infected with the disease when the bite was inflicted."

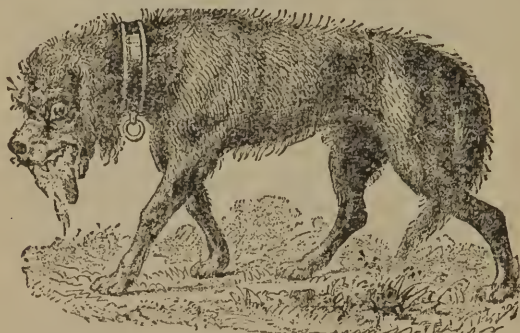
The early symptoms of infection are uneasiness and general depression and in rare instances where the wound has long been healed pain is again felt in the scar. Convulsive seizures affect the muscles of the throat, gradually increasing in severity. Death follows from inability to swallow, from the poisoning and its action upon the heart. The interval between the bite and the convulsion varies from a few days to several weeks, sometimes months, and occasionally a year or more will elapse between the receipt of the injury and the onslaught of the fatal convulsions.

### TREATMENT.

Immediately destroy the germs at the point of inoculation. The thorough burning with nitric acid will put an end to a danger of constitutional infection. This should be done as early after the bite as possible, but it has been proved that even if delayed as long as twenty-four hours further invasion of the disease has been prevented in almost every instance in which it has been employed. The remedy advised is pure nitric acid, which can be obtained from any drug store. This should be thoroughly applied to all points of the wound by means of a small glass pipette or medicine dropper, or, if this cannot be obtained, by a small glass rod or piece of wood, which latter is however gradually charred by the acid. As the application of this remedy is intensely painful the injection into the substance of the skin by means of a hypodermic syringe of a one-half of one per cent. solution of cocaine is used. The infiltration of this same solution into the fat and muscles for a circle of half an inch beyond the

edges of the wound so deadens sensibility that the burning of the acid is not in the least painful. When there is a deep puncture by a single tooth, enlarging the wound slightly by a single incision is advised in order to make sure that the acid may find its way to the very deepest parts of the infected area.

Even after twenty-four hours have elapsed it is believed that great benefit is to be derived from the thorough use of nitric acid. When it is not at hand pure carbolic acid well rubbed into all the recesses of the wound should be substituted, and when this cannot be obtained bits of telegraph wire cut into proper lengths and made red hot may one



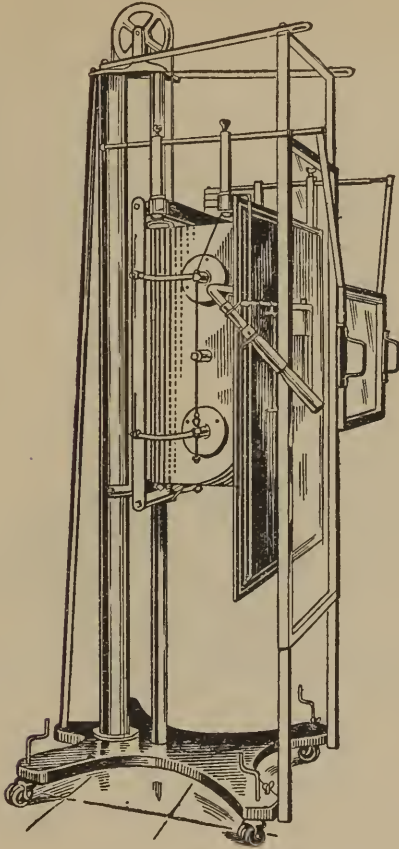
DOG IN THE LATER STAGE OF HYDROPHOBIA.

after another be applied to the wounded surface until a thorough cauterization has been accomplished. In cases which have been neglected or have been treated later than twenty-four hours the Pasteur method is advised. This consists of the injection of a serum prepared after the method of the great French chemist.

In view of the anxiety which naturally follows the bite of a dog or other animal which may possibly be mad it is a wise precaution, even when the diagnosis of hydrophobia in the animal is not positively assured, to treat all cases as if they were inflicted by a diseased animal. The pain and inconvenience is only temporary and should not be considered when it is known that by this treatment all the dangers of this horrible disease may be eliminated.

## KELLY-KOETT VERTICAL FLUOROSCOPE

(IN USE AT INVALIDS' HOTEL)



This wonderful piece of X-Ray apparatus enables the operator to see the organs of the living body moving and acting.

The heart's action can be studied.

Diseases of the lungs, such as tuberculosis, can be diagnosticated.

Examination of the entire digestive tract may be made and ulcer, cancer and displacements of the stomach and intestines definitely determined.

The skull, bones and joints can be studied.

# MECHANICAL AIDS

## IN THE TREATMENT OF

# CHRONIC DISEASES

We have, in different parts of this work, referred to a large variety of ingeniously devised machinery and apparatus employed at the Invalids' Hotel and Surgical Institute, in the treatment of chronic diseases. Although we can, on paper, give but a meagre idea of the variety and adaptability of these valuable mechanical appliances, yet we will endeavor to illus-

*Fig. 1.*



Rubbing the Arm

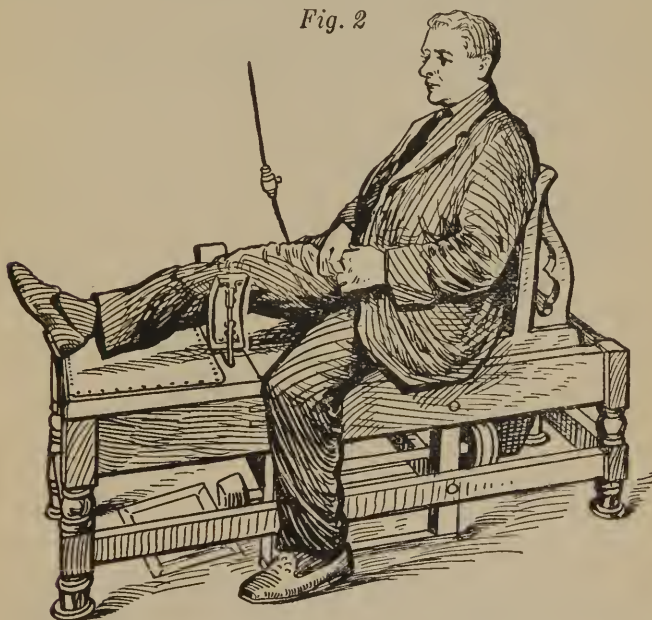
trate and explain a few of our machines and their application of transmitted motion.

These appliances may be referred to quite naturally, as Manipulators since their action resembles so much that of the living operator. It is impossible however for the unaided hand to impart the degree of rapidity necessary to secure the effects easily attained by these machines.

Fig. 1 represents the Arm Manipulator in operation. The machine is propelled by electric motor and power generated at the Invalids' Hotel and Surgical Institute, as here represented. One arm is inserted between the double rubbing

pads, which are raised to about the height of the shoulders, the patient being seated at the side of the machine, and which consist of two opposing elastic adherent surfaces. These have alternate reciprocating action from the rock-shaft and are made to approach each other and press the included part at the will of the patient. All portions of the arm from the shoulder down are successively included in the rubbers, while a suitable degree of rubbing action is attained. To apply the same operation to the other arm, the patient may either turn in his seat or change his position to the other side of the

*Fig. 2*



Rubbing the Leg.

machine. As much pressure may be applied as is perfectly agreeable and which may be diminished at any point unusually sensitive. By holding these reciprocating rubbers in a firm grasp, motion is imparted to the arms, shoulders, chest and abdomen.

Fig. 2 represents the Leg Rubbing Machine or Manipulator. The patient is seated comfortably upon a sliding seat which is drawn forward to the extreme point, and one thigh inserted

between the rubber arms. While the machine is running with the same reciprocating action as in Fig. 1, the seat is gradually pushed backward, the full length of the leg receiving proper action and the whole, including the foot, has a warmth and an improved circulation from the action.

In Fig. 3 is shown the Foot Oscillator which is another valuable aid in the restoration of the circulation in the feet and legs and which is much in favor with all patients whose condition permits its use. The rapid movements or oscillations induced by the motor attached, produce a marked sensation of stimulated circulation and one is conscious of the warming which the member has received. Quick relief is obtained by those who suffer habitually with cold feet.

*Fig. 3*



Foot Oscillator.

The Oscillator receives the foot at a comfortable elevation, the leg being extended while the patient is comfortably seated in an easy chair. The action extends to the thigh and pelvis, though by flexing the knee slightly, the movement is almost entirely confined to the lower leg and foot.

Motion, transmitted by the Manipulator, exerts a curative effect in *all* chronic affections, and is not limited, as is sometimes supposed, to paralytic affections and deformities. In these latter affections it is a great assistance in effecting a cure; while, in chronic affections, whatever the local symptoms,

it supplies the additional energy which is indispensable for recovery in all diseases of long standing.

## SWELLINGS AND TUMORS

The application of motion promotes absorption, and thus *swellings* and non-malignant *tumors* are made to diminish under its use. In these cases the vessels of the affected part are distended with stagnant blood, and a portion of the fluid passes through their walls, distending the surrounding tissues, which become more or less hardened. By the transmission of active motion to the affected parts, the contents of the vessels are urged forward; the outside fluids are thus permitted to return to the general circulation and become subject to the energetic vital action of the general system, local deficiencies of oxidation being increased to the normal degree, causing destruction of morbid matter and giving place for new and wholesome nutritive materials for vital use. In short, normal functional activity is established, both locally and generally. Scrofulous, dropsical, rheumatic, and other local accumulations disappear, and even tumors are dispersed in cases in which the knife would otherwise be required.

## COUNTER-IRRITATION AND REVULSION.

Artificial means have always been employed to produce an energetic flow of blood in different parts of the body, thereby relieving morbid distention of the vessels, and consequent irritation and pain in neighboring parts. Cupping, hot applications, mustard, capsicum, blisters, and other irritants, are resorted to, but their effects, while generally very good in acute cases, are too transient to be of material aid in chronic affections. By the use of mechanical appliances we can produce the most thorough revulsive effects, operating upon large surfaces, and causing large masses of muscle to receive an increased amount of blood, thus drawing it away from parts oppressed by too great a supply, constituting engorgement. No injury is done to the parts acted upon; on the contrary, they are strengthened by the application, which can be

repeated as often as necessary till relief is permanent. Thus, the head, heart, digestive organs, liver, chest, or whatever part is oppressed by excess of blood, may be speedily and permanently relieved. By means of this ability to relieve any part of the system from engorgement, and consequent inflammation and its results, are we enabled to permanently cure a large variety of chronic inflammatory, ulcerative, and nervous affections.

Local inflammations by this method of treatment may be speedily cured.

### NEURALGIA

By the transmission of motion we increase the functional power and activity of the muscles, and thereby diminish morbid sensibility of the nerves, which is present in neuralgia. Prolonged and excessive nervous action is attended with too great a rush of blood to the nerve-centers, which can only be relieved by increasing the flow in the muscles. Congestion, or hyperæmia, in the spinal cord or brain, or both, is a condition ever present in neuralgia. The application of motion causes the blood to flow to the muscles, thus relieving nervous congestion and consequent neuralgia.

### PARALYSIS

In no single disease has the transmission of motion proved more thoroughly efficacious than in *paralysis*. The most prominent requirements in these cases seem to be the following:

Excess of blood in the brain and spinal cord needs to be removed and diverted to parts in which it will be useful instead of obstructive.

The contractile power of the capillaries should be improved.

The quality of nutritive fluids should be improved by the promotion of oxidation through increased circulation.

These and many more wants of disordered nerves, are readily supplied by transmitted motion.

### DEFORMITIES.

Deformities arising from *paralysis and contractions of muscles and tendons*, producing stiffened joints and distorted limbs,

are of common occurrence. A rational explanation of the wonderful curative results which follow the employment of transmitted motion in these cases may not be without interest to the reader. The muscles are composed of *bundles* of little fibers which glide upon one another in every movement. Another set of fibers called *connective tissue*, holds the fibers together in bundles or separate muscles, and interlaces and crosses them in every direction. Now, if these fibers remain long in a fixed position, or are involved in inflammation, there is danger of adhesions forming between them, producing permanent immobility; gliding movements are interfered with, and the muscle ceases to perform its function. Inflammation gives rise to effusion, or the formation of a kind of cement which binds together the muscular fibers and prevents motion.

Rubbing, kneading, and actively manipulating the affected parts with intensity of administration rends asunder and breaks up these minute adhesions, re-establishing gliding motions, causes absorption of effused materials, and restores the affected part to a normal condition.

Fig. 4



Muscular fibres highly magnified.

The deformed limb is straightened by the filling out of the muscle-cells, and increasing the length and also the nutrition of the affected muscles. No pulling or *forced extension* is required. Deformity ceases when the conditions upon which it depends are removed by rational appliances, which are always agreeable. No brace, splints, or other confining appliances

are necessary, except in rare cases in which the bones are very badly distorted.

In withered and deformed limbs, resulting from infantile paralysis, manipulation furnishes the most agreeable, direct and certain remedy. It restores nutrition, sensation, and power, and dispenses almost wholly with mechanical supports. Wry neck and stiffened joints are readily amendable to the beneficial effects of motion.

Contracted and shortened muscles are gradually lengthened

by vigorous, long-continued, and frequently repeated rubbing across their longitudinal fibers; bound-down and confined tendons are liberated and normal movements established.

### DISEASES OF WOMEN

Uterine and ovarian congestion, chronic inflammation, discharges, morbid enlargement, prolapsus, anteversion and retroversion, anteflexion and retroflexion, and other derangements of the womb and its appendages, are radically cured by the vibratory, rubbing, kneading, and other movements, administered through mechanical appliances employed at the Invalids' Hotel and Surgical Institute.



One of several Physicians' Rooms for Examinations and Local Treatments.

To those who are tired of taking medicine, this mode of treatment commends itself as being both agreeable and efficient. There is no case too weak, nervous, or helpless for the use of this curative agent. It is entirely devoid of objectional features, being *always applied outside the clothing*.

**Cause of Female Weakness.** The true relations of cause and effect are very liable to be misunderstood, when considering the various diseases incident to the organs contained in

the female pelvis. Treatment intended to be remedial is therefore very often misdirected and fails to afford relief, positive injury frequently resulting instead. When the nature of these diseases is properly understood, their cure can be effected with comparative ease.

These diseases are always attended with weakness, which is often very great, of the muscles that hold the diseased organs in position. The muscles forming the walls of the abdomen, and the diaphragm, or midriff, all of which are concerned in the act of respiration, become feeble and only partially perform their functions. In health, they act constantly, even during sleep, producing a rhythmical movement, which is communicated to the contents of the abdominal and pelvic cavities. This motion promotes a healthy circulation in the parts. In almost all affections of the pelvic organs, this normal condition is greatly diminished.

Diminution of the motions of respiration is attended with an increase of the amount of the blood in the pelvic organs, constituting an engorgement of the parts, called congestion, or inflammation. This gives rise to enlargement of the womb, ulcerations, tumors, and a multitude of kindred secondary effects, usually considered as the primary disease and treated as such. The contents of the cavity of the trunk, weighing several pounds, are allowed to gravitate down and rest upon the contents of the pelvis, forcing the congested uterus and ovaries down out of their natural positions, and often bending or tipping the womb in various directions. A long list of symptoms follows as the natural consequence of these abnormal conditions.

**Rational Treatment.** Ovarian congestion and inflammation, inflammation of the uterus, ulceration of this organ, deranged menstruation, leucorrhea with the attendant pain, nervousness, and other derangements depending upon loss of supporting power in the abdominal muscles, all result from loss of the *natural* motions of respiration, and consequent deranged circulation. These several conditions can be cured by removing their cause. When the power of the parts involved in the

weakness is restored, all these morbid conditions disappear. Judicious cultivation of power in the weakened supports is attended with certain curative results. This is best accomplished by mechanical motion, by which the normal circulation is restored, inflammations and congestions are subdued, displacements corrected, ulcers healed, and functional activity is re-established.

### RECAPITULATION.

Motion properly transmitted to the human system by mechanical apparatus is transformed into other forms of force identical with vital energy, by which the ordinary processes of the system are greatly promoted.

It increases animal heat and nervous and muscular power to the normal standard.

It removes engorgement or local impediments to the circulation.

The electrical induction produced renders it most efficacious in paralysis.

It removes interstitial fluids and causes rapid absorption and disappearance of solid and fluid accumulations.

It is a powerful alterative, or blood-purifier, increasing oxidation and stimulating excretion.

It diminishes chronic nervous irritability and promotes sleep.

It hardens the flesh by increasing muscular development and improves digestion and nutrition.

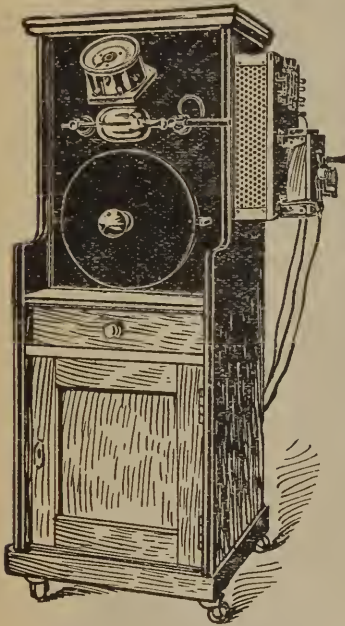
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Health depends upon the flow of blood to the various organs and parts of the body, it consists in general terms upon the passage through the blood vessels of serum that furnishes the nourishment to the cells, and the return of this serum through the lymphatics and veins to the organs that remove from the blood, the poisons that the cells have thrown into the venous blood.

The mechanical benefit of massage is to increase the activity of this process. It aids in carrying healthy blood to weak-

ened or imperfectly nourished organs, and assists in a prompt return flow of the used up and poisoned blood that comes from the cells and its removal from the body through such organs as the kidneys, the lungs, the liver and the bowels.

The mechanical appliances of massage are of benefit because they make these changes more rapidly. Many persons are so weak they cannot exercise, or their age is such that they cannot with safety get around so as to further the rapid flow of good blood to weakened organs and the expulsion of unhealthy material from the blood.



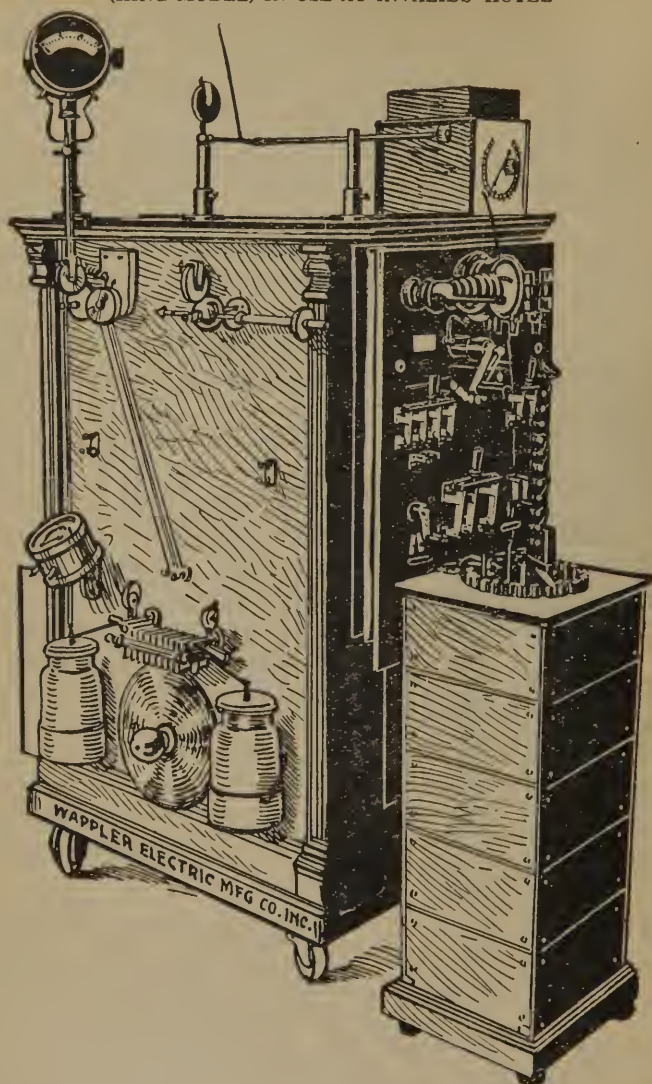
Excell High Frequency Machine  
(Wappler) used at Invalids' Hotel.

These mechanical appliances are for the purpose of aiding in this work. They are run by motors, they are tireless, and an individual can receive as much massage and helpful aid as may be required. This method of treatment is directed by competent and trained assistants who see that the right amount is administered. The results are a rapid improvement in the health and all the benefits that come from outdoor exercise without its tiring effects, or the injurious results upon the heart that may come from over-exertion.

In the Invalids' Hotel our aim is to furnish good foods, aid in proper digestion and assimilation, and to remove from the body unhealthy results of body waste. Fat people are made thin, and weak persons are strengthened and developed by this method of treatment.

It is not what one eats but what is assimilated that benefits.

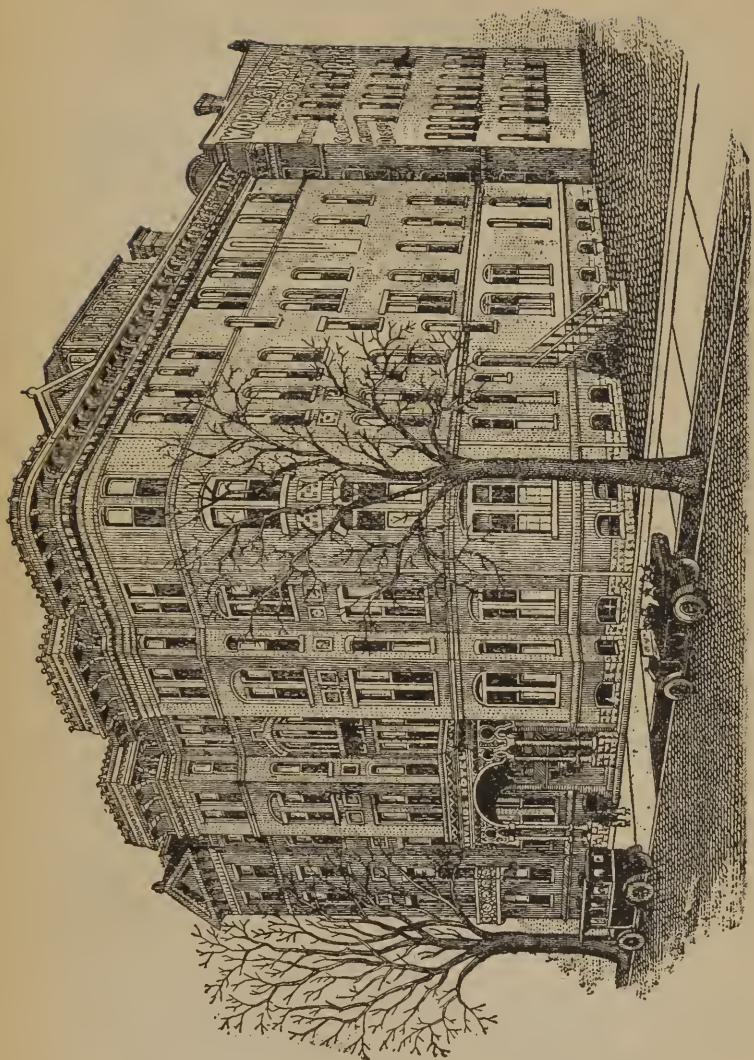
"WAPPLER INTERRUPTERLESS X-RAY TRANSFORMER"  
(KING MODEL) IN USE AT INVALIDS' HOTEL



This machine generates the high tension current which is passed through the safest and best of X-Ray tubes.

Pictures or photographs of any part of the body and various internal organs are made by our experts.

The X-Ray is also used by us very successfully in the treatment of tumors to prevent their growth, and for the relief of skin and other diseases.



INVALIDS' HOTEL, 665 MAIN STREET, BUFFALO, N. Y.

THE  
**Invalids' Hotel**  
AND  
**Surgical Institute**

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*SOME OF THE CAUSES THAT  
LED TO ITS ERECTION.*

**ITS MANY ADVANTAGES.**

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In Dr. Pierce's Invalids' Hotel and Surgical Institute are many physicians. Each one is a specialist in some particular branch, and after the patient is carefully questioned the case is then assigned to the doctor who, in Dr. Pierce's judgment, can do best in that department of medical practice. With this specialist the patient advises and consults and has the benefit of his skilled opinion. A hundred years ago the doctor and barber were combined in one man and both were spillers of blood. To-day medicine and surgery have reached the point of being a fine art. Each operation in surgery requires a distinct and peculiar skill. The ordinary family practitioner attempts everything. The country doctor, with a case of instruments and a case of medicines, looks after the children with the measles, extracts teeth, amputates limbs and prescribes for all the ailments to which flesh is heir.

Modern life has evolved the specialist. This plan of specialization reaches the point of the highest possible medical efficiency. The operators at the Invalids' Hotel work surely, and they work rapidly; also, they work painlessly.

There is no charge for consultation. Each case is carefully considered. A specialist consults with you, and then tells you what he thinks should be done. After such consultation you may have your case taken care of at the Invalids' Hotel, or at your home if it is believed that you can be benefited by "home treatment."

Dr. Pierce is a common sense business man, as well as benefactor. He knows that most all things in life average about right, that where we honestly try to help humanity we benefit ourselves. He does not figure on how much he can make out of a patient. All the physicians and surgeons in his Institution work on stated salaries so there is no temptation for them to prolong their work to enlarge the fees. In fact the natural inclination is for a specialist to cure the patient in as short a time as is consistent with good treatment, and in this way make room for another patient. This Institution is always well filled with patients and rarely are there any vacant rooms.

The method pursued at the Invalids' Hotel would interest any visitor, and all visitors are made welcome. The visitor here finds that there are more than a dozen physicians, each chosen for his skill along certain lines, and through a system of constant co-operation and consultation they are able to give the public an ideal service. All doctors cannot use the knife. Some can successfully treat invalid women. Others have mechanical and scientific skill in the operating room. The Staff at the Invalids' Hotel consists of both surgeons and specialists. But no one is treated surgically who can possibly be benefited or cured without the use of the knife. It has been a rule laid down by Dr. Pierce, that an operation shall only be determined upon when there is every reason to believe that a cure is impossible with medicines or electricity. You will not find any one of our surgeons insisting upon performing an operation simply because he can charge many times a physician's regular fee.

### A REMEDIAL HOME.

Of the 105,683,108 people residing in the United States to-day, it is estimated that over twelve millions are sufferers from chronic disease. Think for a moment! Twelve millions of people slowly but surely dying by the insidious and fatal development of chronic diseases! This is an appalling fact. Yet this is the very class of diseases with which the general practitioner is least familiar.

As a general practitioner of the healing art, fresh from curriculum, the founder of this Institution early realized that the great, unpardonable fault or error of the medical profession was the neglect to more thoroughly study and investigate this class of diseases.

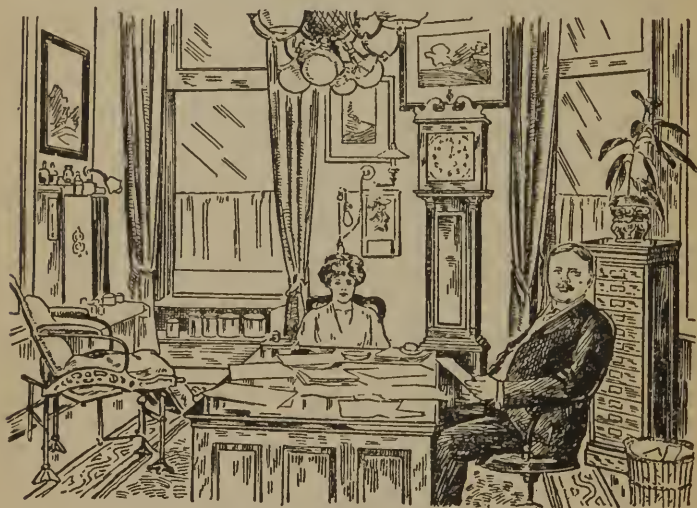
The profession is diligently cauterizing and poulticing the

sores which now and then appear on the surface, but the internal chronic disease, of which these are merely the external signs, is too often overlooked or neglected.

Some years ago we devised and put into practical operation a method of

### TREATING PATIENTS AT THEIR HOMES,

without requiring them to undergo personal examinations. We reasoned that the physician has abundant opportunity to accurately determine the nature of most chronic diseases without ever



THE HEAD SURGEON'S OFFICE.

seeing the patient. In substantiating that proposition, we cited the perfect *accuracy* with which scientists are enabled to deduce the most minute particulars in their several departments, which appears almost miraculous if we view the subject in the light of the early ages. Take, for example, the electro-magnetic telegraph, the greatest invention of the age. Is it not a marvelous degree of accuracy which enables an operator to *exactly* locate a fracture in a sub-marine cable nearly three thousand miles long? Our venerable "clerk of the weather" has become so thoroughly familiar with the most wayward elements of nature that he can accurately predict their movements. He can sit in Washington and foretell what the weather will be in Florida or

New York, as well as if hundreds of miles did not intervene between him and the places named. And so in all departments of modern science, what is required is the knowledge of certain *signs*. From these, scientists deduce accurate conclusions regardless of distance. A few fossils sent to the expert geologist enable him to accurately determine the rock-formation from which they were taken. This he can describe as perfectly as if a cleft of it were lying on his table. So also the chemist can determine the constitution of the sun as accurately as if that luminary were not ninety-five million miles from his laboratory. The sun sends certain *signs* over the "infinitude of space," which the chemist classifies by passing them through the spectroscope. Only the presence of certain substances could produce these solar signs.

So, also, in medical science, *disease has certain unmistakable signs*, or symptoms. By reason of this fact, we have been enabled to originate and perfect a system of accurately determining the nature of chronic diseases without seeing and personally examining our patients. In recognizing diseases without a personal examination of the patient, we claim to possess no miraculous powers. We obtain our knowledge of the patient's disease by the practical application of well-established principles of modern science to the practice of medicine. And it is to the accuracy with which this system has endowed us that we owe our almost world-wide reputation for the skillful treatment of all lingering, or chronic, affections. This system of practice, with the marvelous success which has been attained through it, demonstrates the fact that diseases display certain phenomena, which, being subjected to scientific analysis, furnish abundant and unmistakable data to guide the judgment of the skillful practitioner aright in determining the nature of diseased conditions.

So successful has been this method of treating patients at a distance that there is scarcely a city or village in the United States that is not represented by one or more cases upon the "Records of Practice" at the Invalids' Hotel and Surgical Institute. In all chronic diseases that are curable by medical treatment, it is only in very rare cases that we cannot do as well for the patient while he or she remains at home, as we could if here

under personal supervision. But we annually treat hundreds of cases requiring surgical operations and careful after-treatment, and in these cases our Invalids' Hotel, or home, is indispensable. Here the patient has the services not only of the most skillful surgeons, but also, what is quite as necessary in the after-treatment, of thoroughly trained and skilled nurses.

### SITUATION

The location of the Invalids' Hotel and Surgical Institute is ideal. Buffalo is a city of 506,118 population. It is situated in



McKINLEY MONUMENT — NIAGARA SQUARE, BUFFALO, N. Y.

the western part of New York State, on the eastern shore of Lake Erie, at the mouth of the Niagara River. It is on the principal route from the East to the West, and this has been the thoroughfare for a century. It is a great railroad center.

The climate is salubrious. In the winter the thermometer seldom reaches zero. If you will look at a map you will see that a line drawn from Buffalo to Duluth, passes over a region well covered with great lakes, and this northwest line is the direction of the prevailing winds. There may be more clouds than in some other places, but clouds help to warm in winter and

shield from excessive heat in summer. There is, however, an abundance of sunlight. The fall weather is especially charming. Storms, rains and snowfalls are always greater ten to fifty miles outside the city than in it. It is sometimes called the "breezy city," but the velocity of the wind never equals that of other lake cities, and is often much lower than in New York City. The winds are welcome during the summer.

The Institution is located in the city. It is within ten minutes' walk of the shopping district. Trolley cars on several routes pass the door, and by using a "transfer," which is free and given upon request when paying the fare, distant parts of the city, the parks, depots, boat landings and suburbs can easily be reached.

Buffalo is called the Queen City of the Lakes. Here Lake Erie empties into the historic Niagara River which carries on her bosom, swiftly flowing onward, the waters of the Great Lakes, Superior, Huron, Michigan and Erie, plunging 22 miles below over the great Falls of Niagara, then through the lower rapids and whirlpool to emerge at Lewiston into the deep flowing Niagara from whence steamboats convey tourists across Lake Ontario to Toronto, a delightful ride.

### NIAGARA FALLS, ONE OF NATURE'S GREATEST WONDERS,

is distant but an hour's trolley ride, or but forty-five minutes by the steam cars. People from all parts of the world visit this magnificent cataract. A visit to Buffalo should never be planned without including this trip. Can you comprehend a cubic mile of water, a mile long, a mile wide and a mile deep? Hardly. This is the estimated quantity of water that flows over the brink every week. It is just as incomprehensible when stated in a commercial way—a matter of three million horsepower per hour. Niagara Falls is the greatest falls in the world when volume of water is considered. It is ever changing in its charms and beauties, in its clouds of spray, its rainbows, its light and shade—with the position of the sun or moon, the deviation in the direction of the wind, the condition of the atmosphere, with the variation of seasons; but ever and always is sublime. The sight may dwarf your idea of the importance and significance of man, but it will certainly augment your appreciation of the power and majesty of the Creator. There have

been many attempts at description of its grandeur and its effects upon the mind of the beholder, but one and all have given up in despair or signally failed. Nor do paintings, photographs or the cyclorama help much. It may represent a part



NIAGARA FALLS—AMERICAN SIDE.

for the fraction of a second. We miss the motion, the very life, so to speak, and there is wanting the prominent characteristic which moved the Indian to name it Niahgahra, "The Thunderer of the Waters." Each one has to see it with his own eyes and experience his own impressions and emotions.

## A GENUINE HOME.

In erecting the Invalids' Hotel and Surgical Institute, our paramount design was to make it a genuine home—*not a hospital*—a home where the child of fortune would miss none of the comforts of a palatial home, while the poor man would find not only health but his pleasures multiplied a thousand fold.

## OUR TERMS MODERATE.

The wholesale merchant's prices are far less than those of the retail dealer. He can afford it, his sales are so much larger. It

Any sick person may consult our faculty by letter absolutely free. While consultation and advice at the Invalids' Hotel, Buffalo, N. Y., are absolutely FREE there is a CHARGE for careful, painstaking examination, tests by X-ray, Blood Count, Analysis, etc., merely to cover the cost of the different doctors' time and the materials used.

is on precisely the same principle that we are able to make the rates at the Invalids' Hotel and Surgical Institute comparatively low. If we had only a limited number of

patients, we should be obliged to make the charges commensurate with our expenses; but our practice having become very extensive, and the income being correspondingly large, we are enabled to make the rates at the Invalids' Hotel and Surgical Institute so moderate that all who desire can avail themselves of its medical, surgical, and hygienic advantages.

## FACILITIES FOR TREATMENT.

Of the many advantages afforded by the Invalids' Hotel and Surgical Institute in treating disease, we can make only brief mention of a few of the more prominent.

## DIVISION OF PRACTICE.

In the examination and treatment of patients, our practice is divided into specialties. Each member of the Faculty, although educated to practice in *all* departments of medicine and surgery, is here assigned to a special department only, to which he devotes his entire time, study and attention.

*If you desire Free medical advice, write the Faculty of the Invalids' Hotel, Buffalo, N. Y., confidentially.*

## ADVANTAGES OF SPECIALTIES.

The division-of-labor system proves equally effectual in the practice of most of the professions. The legal profession has long been conducted in this manner. One lawyer devotes his attention specially to criminal law, and distinguishes himself in this department. Another develops a special faculty for unraveling knotty questions in matters of real estate, and, if a title is to be proved, or a deed annulled, he is the preferred coun-



THE GENTLEMEN'S READING ROOM.

selor. In a certain manner, too, this has long been practiced by the medical profession. Thus some physicians (and we may add physicians who call themselves "regular," and are specially caustic in their denunciation of "advertising doctors") are accustomed to distribute cards among their patrons, certifying that they give special attention to diseases of women and children. In this Institution each physician and surgeon is assigned a special department of medicine or surgery. By constant study and attention to his department, each has become a skillful specialist, readily detecting every phase and complication of the diseases referred to him. Not only is superior skill thus attained, but also *rapidity* and *accuracy* in diagnosis.

Thoroughness and efficiency in any branch of learning can be secured only by devoting to it special study and attention. When the faculty of a university is to be chosen, how are its members selected? For instance, how is the chair of astronomy filled? Do they choose the man who is celebrated for his general scholastic attainments, or do they not rather confer it upon one who is known to have devoted special attention and study to the science of astronomy, and is, therefore, especially qualified to explain its theories and principles? Thus all the several chairs are filled by gentlemen whose general scholarship not only is known to be of the highest standard, but who devote special attention to the departments assigned them, thus becoming proficient specialists therein. The same system of specialties is observed in the departments of a medical college. The professor who would assume to lecture in all the departments with equal ease and proficiency would be severely ridiculed by his colleagues; and yet it is just as absurd to suppose that the general practitioner can keep himself informed of the many new methods of treatment that are being constantly devised and adopted in the several departments of medicine and surgery.

### PROGRESS IN MEDICINE

In no other science is more rapid and real progress being made at the present time than in that of medicine. Even the specialist must be studious and earnest in his work to keep himself well and accurately informed of the progress made in his department. Thus it so often happens that the general practitioner pursues old methods of treatment which science has long since replaced with others acknowledged to be superior. The specialist, on the contrary, by confining his studies and researches to one class of diseases only, is enabled to inform himself thoroughly and accurately on all the improvements made in the methods and means of practice in his special department.

The difference between the practice of specialists and that of general practitioners is aptly illustrated by the difference between the old-fashioned district school, in which the school-master taught all the branches, from a-b-c's to the solution of unknown quantities and the charmed mysteries of philosophy, and the modern seminary, with its efficient corps of teachers, each

devoting his or her whole attention to the study and teaching of one special department of learning.

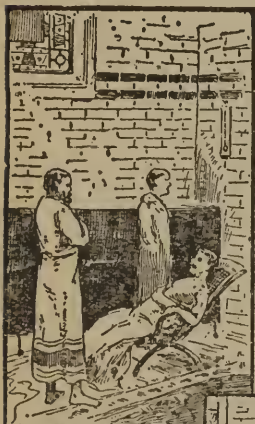
We attribute the success which has attended the practice at the Invalids' Hotel and Surgical Institute, in a great measure, to a wise adoption of this system of specialties.

### ADVANTAGES OFFERED TO INVALIDS.

Obviously, the most important of these advantages is *facility of treatment*. Of the thousands whom we have cured of chronic diseases, we have probably not seen one in five hundred, having accomplished the desired result through remedies sent either by mail or express and advice given by letter. Yet in some obstinate forms of disease we can here bring to bear remedial means not to be found or applied elsewhere.

That thousands of cases of chronic diseases, pronounced incurable, have, by our rational and scientific treatment,

been restored to perfect health, is conclusively proved by the records of practice at the Invalids' Hotel and Surgical Institute. In the more obstinate cases, are employed all the most scientific remedial appliances and methods of treat-



A glimpse at the Turkish Bath Department.

ment, combined with the best remedies of the *Materia Medica*.

A system of mechanical movements, passive exercises, manipulations, kneadings and rubbings, administered by a large variety of ingeniously-contrived machinery, driven by electricity, has been found especially efficacious and valuable, as an aid to medical and surgical treatment, in the cure of obstinate cases of nervous and sick headaches, constipation, paralysis or palsy, stiffened joints, crooked and withered limbs, spinal curvature,

tumors, diseases of women, especially displacements of the uterus or womb, such as prolapsus, retroversion and anteversion, chronic inflammation, enlargement and ulceration of the uterus, and kindred affections, also of nervous debility, sleeplessness, and other chronic diseases. By these machines mechanical power, or force, is transmitted to the system, in which it is transformed into vital energy and physical power or strength. This mechanical, passive exercise, or movement-cure treatment, differs widely from, and should not be confounded with, "Swedish movements," to which it is far superior in efficacy. Coupled with our improved and wonderful system of "Vitalization"



THE VIBRATORY MASSAGE ROOM.

treatment, it affords the most perfect system of physical training and development ever devised. For the restoration of power to wasted, undeveloped, or weakened organs or parts, or their enlargement, this combined movement and "Vitalization" treatment is unequalled. It can be applied to strengthen or enlarge any organ or part. We also employ both Dynamic and Static electricity, "Franklinism" and Electrolysis, and Chemical, Turkish and other baths, in all cases in which they are indicated. Inhalations, administered by means of the most approved apparatus, are employed with advantage in many obstinate lung, bronchial and throat affections. We have no hobby or one-idea system of treatment, no good remedial means being overlooked or neglected,

## A FAIR AND BUSINESS-LIKE OFFER.

Reader, are you accustomed to think and act for yourself? Do you consult your own reason and best interests? If so, then do not heed the counsel of skeptical and prejudiced friends, or jealous physicians, but listen to what we have to say.

You perhaps know nothing of us, or our system of treatment, or of the business methods we employ. You may *imagine*, but you *know nothing*, perhaps, of our facilities and advantages for performing cures in cases beyond the reach or aid of the general

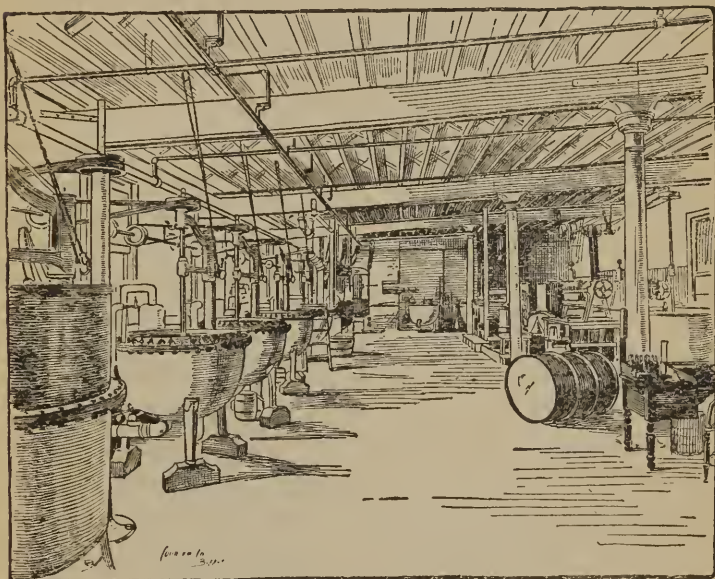


PATHOLOGICAL LABORATORY OF THE INVALIDS' HOTEL.

practitioner. Knowing nothing of all these advantages, you still know as much as the would-be friend or physician who never loses an opportunity to prejudice the afflicted against us. Permit us to state that we have the largest, the best, and the finest buildings of any like Association, company, or firm in this country. We employ *more and better* medical and surgical specialists than any similar Association, and actually have more capital invested. We have a thoroughly qualified and eminent specialist for every disease that we treat. We treat more cases, *and absolutely cure more patients* than any similar institution in America. In addition to those we treat medically, we perform

all the most difficult surgical operations known to the most eminent surgeons, and so frequently do many of these operations occur that some of our specialists have become the most expert and skillful surgeons on this continent.

We wish to add further that we are responsible to *you* for what we represent; we therefore ask you to come and visit our Institution, and, if you find on investigation that we have mis-



SECTION OF CHEMICAL LABORATORY.

stated or misrepresented *in any particular* our advantages, or our success in curing chronic diseases, *we will gladly and promptly refund to you all the expenses of your trip.* We court honest, sincere investigation, and are glad and anxious to show interested people what we can do and are daily doing for suffering humanity. If you are afflicted and are seeking relief, come where genuine ability is a ruling feature, where *success* is the watchword and the alleviation of human suffering the paramount mission.

Whether arriving in Buffalo by day or night, *come directly to the Invalids' Hotel and Surgical Institute, 665 Main Street,* where you will be hospitably received.

*Editorial from Sunday New York American.*

The young man who begins life with the idea that what is old is necessarily right and what is new is necessarily wrong will have a poor chance in competition with his more wide-awake fellows.

A doctor in practice in a large city recently cautioned a class of students to preserve the traditions of their profession, to remember how ancient and how honorable is medicine, and to beware of innovations and untried experiments. Beautiful advice this to a class of prospective physicians, whose trade has been busy for the last fifty years throwing tradition to the winds and finding new ways to get results. There is hardly a successful doctor of the present age who would not shock his grandfather beyond words by the innovations he has adopted and employed successfully. Vaccination is in violation of tradition; so is the anti-toxin treatment for diphtheria; so is the open-air treatment for consumption. The tradition-following doctor of fifty or a hundred years ago tapped the veins of every ill man who came to him and allowed quantities of his blood to escape. Bleeding was a tradition—and a tradition that killed more victims than war or pestilence. Modern medical thought put an end to bleeding. Quietly and effectively physicians have been disposing of practically every tradition of their profession, and because they have done so thousands of lives have been saved.

No career based on tradition will succeed. The instinct of the animal excels the intellectuality of the man who lives in constant fear of doing something new.

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**DR. PIERCE'S GOLDEN MEDICAL DISCOVERY** and **DR. PIERCE'S FAVORITE PRESCRIPTION** may now be had in **TABLET FORM**. Two Sizes, to Retail at 65 cents and \$1.35. Sold by all dealers in medicines, or mailed on receipt of price.

# NEW RAYS OF LIGHT.

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People who have been patients at Dr. Pierce's Invalids' Hotel, at Buffalo, N. Y., have much to say in regard to its resources. This modern, up-to-date sanitarium not only affords the best medical and surgical treatment by experienced physicians but it also provides every remedial agent for the treatment of disease without medicines. One of the most wonderful, to the



X-ray photo showing Broken Wrist.

average layman, is the X-ray which may be used both in the treatment of various diseases and in the diagnosis of many obscure conditions. With the aid of this the interior of the human body is no longer the sealed book it has been heretofore. Abnormal states of the bones, gall stones, stone in the bladder or in the kidneys, are now shown plainly by what are known as X-ray photographs. Internal tumors, and the enlargement of the deep seated organs, are also discovered by this means, and in the diagnosis and treatment of tuberculosis of the lungs this agent

has proven a most valuable aid. Many obstinate skin diseases, such as psoriasis and eczema, yield in a most pleasing manner to the effects of these wonderful rays.

The incandescent light bath, consisting of a cabinet in which the patient is bathed in the combined rays of many electric light globes, is a powerful therapeutic agent. It has produced really wonderful results in diabetes, sciatica, rheumatism, obesity, anæmia, and some forms of kidney and heart trouble. It has also proven valuable in chronic bronchitis, bronchial asthma and

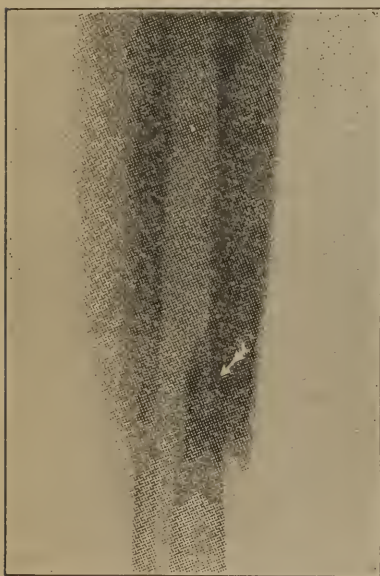
the various skin diseases. As a general hygienic measure, its efficiency can scarcely be over-estimated.

The violet-ray treatment, which is another interesting procedure, is carried out by concentrating the light, rich in the violet or chemical rays, from an arc light with a specially prepared carbon, upon any portion of the body that may be the seat of pain. Sufferers from neuralgia, sciatica, rheumatism, strains, sprains, also from those obscure, wearing pains (the origin of which cannot at times be accurately determined) frequently find immediate relief from a single treatment and usually with a

little persistence in the use of this aid, comfortable health or perfect recovery is obtained.

There is also the electric water bath that soothes many a nervous patient to rest and quietness. This is a material aid in hastening the recovery of the dyspeptic, neurasthenic and melancholic to cheerfulness and health.

Not the least unique is the apparatus for mechanical massage, which enables a patient who needs exercise to take it while lying at ease, each muscle or set of muscles being stroked or manipulated as the necessities of the case demand. Of a similar character are the electrical and mechanical vibratory



X-ray photo showing Broken Bone  
of the Leg.

machines that are used to equalize the circulation, stimulate the nerves to healthy action and improve general nutrition. When one realizes that these machines can exercise perfectly almost any and every muscle of the body without a voluntary movement on the part of the patient, their wide range of usefulness will be appreciated.

Of interest, too, are the twelve-plate, static electric machines, capable of throwing miniature flashes of lightning, 20 to 24 inches long. The action of these efficient pieces of apparatus is

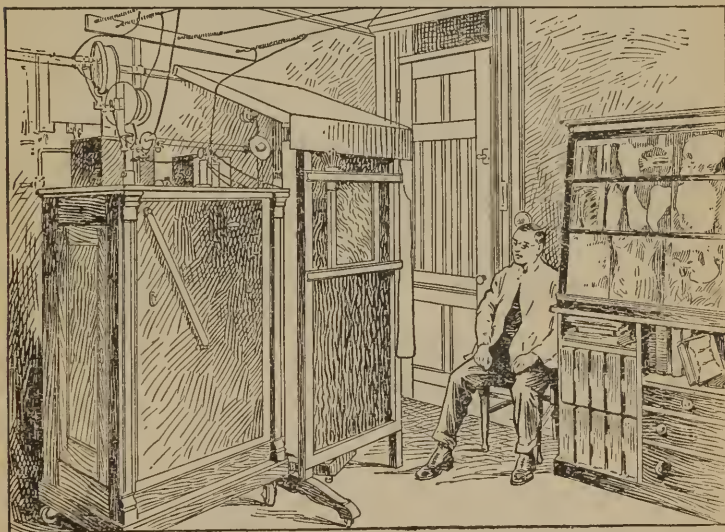
so regulated that in spite of their power they are suited to the treatment of the most delicate child or nervous woman, upon whom, as upon others, they produce the most soothing and satisfying effects.

In addition galvanism is employed in the treatment of tumors, without operation, and also in connection with Faradism, in restoring flexibility to stiffened joints and contracted muscles and in imparting motion to partially paralyzed limbs.

## HIGH-FREQUENCY

(OSCILLATING CURRENT).

This term is especially applicable to electrical currents obtained by means of the rapid charge and discharge of a condenser,

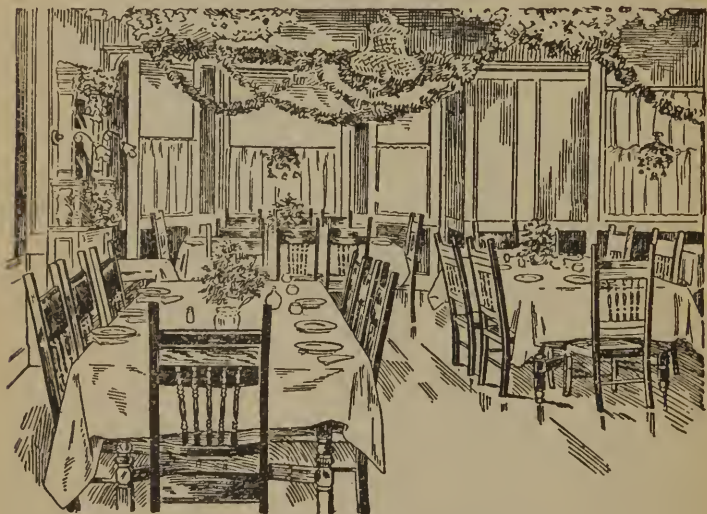


Corner of the X-Ray Room, Invalids' Hotel.

which produces very rapid oscillations. The frequency of oscillations is exceedingly great, amounting at times to hundreds of millions of cycles in a second. The high-frequency current differs in several respects from a disrupted static current which is essentially a high potential current, 10,000 to 50,000 volts, with a minimum amperage, usually about .0005, regarded as too small for high-frequency purposes.

High-frequency currents possess unusual therapeutic powers, both general and local. They apparently promote circulation and increase vitality. They are rich ozone generators, and, when applied to unhealthy granulations and various skin diseases, act as an oxidizer, antiseptic and disinfectant. Applied to the skin before incision, they will render the site aseptic.

For general effect the patient is placed upon an auto-condensation couch or in the center of an auto-conduction cage. In the treatment of sub-acute and chronic rheumatism, sciatica, neurasthenia, etc., the condenser couch is most useful.

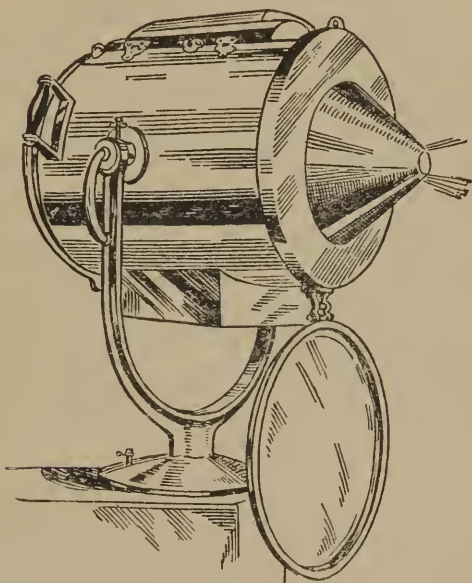


SMALL SECTION OF DINING ROOM—INVALIDS' HOTEL.

A notable characteristic of the high-frequency oscillating currents is their lack of power to excite the motor nerves, and aside from a slight sensation of warmth, there is no excitement to the sensory nerves at the point where the electrode touches the body. This is due to the fact that they oscillate with such rapidity that the nerves cannot respond to them. The accepted explanation is, that the nerves respond to certain frequencies of stimulus; reaction of the motor nerves takes place up to about 5,000 frequencies; if these frequencies are gradually increased, muscular contraction diminishes and finally ceases. This theory is in line with reason-

ing as to the cause of action of the special senses—sight and hearing.

To generate a high-frequency current it is usual to charge two Leyden-jar-condensers with a high potential current, the source of which may be a static machine or induction coil, shunting the



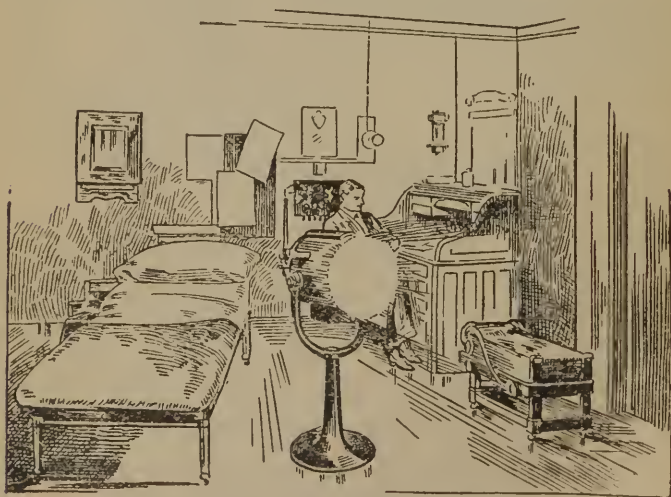
Mechanism for producing violet and other rays of  
high wave length—used in Eczema, Lupus,  
Carcinomas and other affections.

two wires with a spark-gap for the purpose of disrupting the current. The external armatures of the condensers are short-circuited through a solenoid, or helix consisting of a few turns of coarse copper wire (d'Arsonval). The helix may be substituted by a straight copper bar (Sheldon). The upper part of the helix resonates in unison with the lower, when properly in tune, as would a tuning-fork resonate with another of the same pitch. The office of the extended helix is to amplify the current.

Another arrangement is after Tesla: The primary of a specially constructed induction coil is energized by an alternating current. The secondary terminals, giving a potential of 15,000

volts, are connected, one to each side of a suitable condenser. From each of these terminals a shunt is taken. One leads to one end of the primary of a Tesla coil; the other, broken by a spark-gap, is connected to the second terminal of the primary. The frequency obtained from the Tesla apparatus is fabulously high—millions a second. The potential may be hundreds of thousands or millions of volts. The amperage is sufficient to light to full candle-power several incandescent lamps. The primary of the induction coil consumes 15 to 25 amperes. For maximum high-frequency effects this type of apparatus seems to be essential. There are many modification of this apparatus.

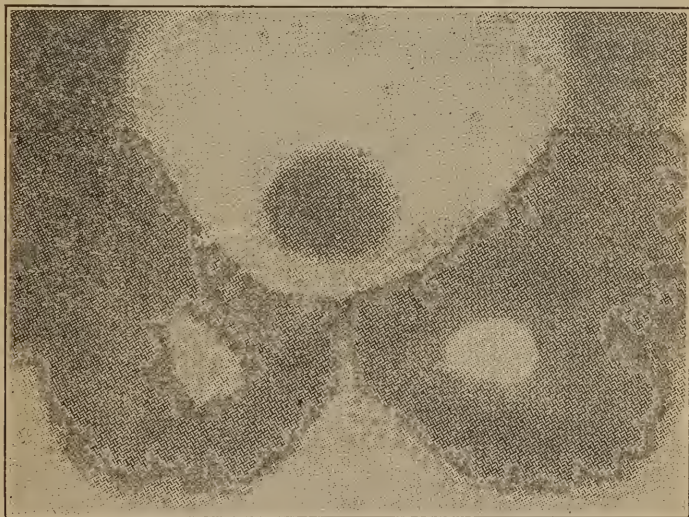
At the terminals of a working high-frequency apparatus is seen a beautiful brush discharge or effluve of a peculiar blue color, which will leap to any object brought near it. Interpose a plate glass one-half inch thick (or more), and the effluve will penetrate it. If the object is a vacuum tube it will glow almost as brightly as if nothing intervened. It is an ideal current for igniting Geissler and low-vacuum X-ray tubes; only one terminal need be connected. The brush discharge from the terminals of a Tesla apparatus may be 20 or even 50 inches in length. The effect of this effluve on the skin is a sensation of warmth, combined with the feeling that would probably be produced by small hail-stones falling on the body.



One of the Rooms for Electrical Treatment.

## CURED AT HOME.

A Bureau of Correspondence constitutes a prominent feature of the Invalids' Hotel and Surgical Institute, through which many thousands of chronic invalids are annually cured without having to visit the Institution for personal examination. If those suffering from chronic ailments will write and describe their symptoms, inclosing in their letters ten cents in stamps to pay postage, complete Treatises on their particular diseases will be sent by return post, with special question blanks designed to aid the afflicted in describing their maladies. When one of these question blanks is carefully filled out and returned to the Bureau of Correspondence, the Faculty will, after careful deliberation, prepare its opinion as to the nature and curability of the case described, and submit it to the patient; and if the case be one in which they are confident of being able to effect a cure by medicines specially prepared for home treatment, they will state the cost of the necessary remedies. If the case described be one requiring a surgical operation, or one which can in their opinion only be successfully treated at the Institution, where the patient can have the benefit of all the advantages, appliances and facilities which such a thoroughly equipped establishment affords, then terms for such treatment (including board) will be given. Patients are never advised to incur the extra expense of visiting the Institution when it is believed they can be cured at home without a personal examination.



X-RAY PHOTOGRAPH OF A STONE IN THE BLADDER,

# SUCCESSFUL TREATMENT OF CHRONIC OR LINGERING DISEASES.

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For many years the founder of the Invalids' Hotel and Surgical Institute and World's Dispensary devoted himself very closely to the investigation and treatment of chronic diseases. Some few specifics had during this time been developed for certain forms of chronic ailments, and given to the public, but they have not been lauded as "cure-alls," or panaceas, but only recommended as remedies for certain well-defined and easily recognized forms of disease. These medicines are sold through druggists very largely, and have earned great celebrity for their many cures. So far from claiming that these proprietary medicines will cure all diseases, their manufacturers advise the afflicted that, in many complicated and delicate chronic affections, they are not sufficient to meet the wants of the case. These must have special consideration and treatment by a competent physician and surgeon, the medicines and other remedial means required being selected and prepared with reference to each particular case.

In order to be able to offer those afflicted with chronic ailments the most skillful medical and surgical services, Dr. Pierce, many years ago, associated with himself several eminent physicians and surgeons, as the Faculty of the old and renowned World's Dispensary, the Consulting Department of which is now merged with the Invalids' Hotel and Surgical Institute.

## DIVISION OF PRACTICE.

In the organization of the medical and surgical staff of the Invalids' Hotel and Surgical Institute, several years ago, we assigned to one physician the examination and treatment of diseases of the nervous system; to another, surgical operations and the treatment of surgical diseases; a third had charge of catarrhal and pulmonary diseases and affections of the heart; a fourth attended to diseases peculiar to women; a fifth, to diseases of the eye and ear; a sixth, to diseases of the digestive organs; a seventh, to special surgical cases; to another we entrusted diseases of the urogenital organs; and to others, various other specialties. Now that our practice has become so very extensive as to require for its conduct a greatly increased number

of physicians and surgeons, we have been obliged to detail to several of these divisions or specialties in practice, two, three, and even four physicians and surgeons. Thus four physicians devote their undivided attention to the examination and treatment of diseases of the urinary and generative organs of men. Three physicians give their sole attention to diseases peculiar to women and three to those of the nasal organs, throat and chest, embracing all chronic diseases of the respiratory organs. Thus we have a full council of three and four physicians in these several specialties. In several other divisions we have two special-



A Patient's Room.—Invalids' Hotel and Surgical Institute.

ists. No case is slighted either in the examination or in the treatment. All doubtful, obscure or difficult cases are submitted to a council composed of several physicians and surgeons. Skilled pharmacutists are employed to compound the medicines prescribed. For the purpose of enabling us to conduct our extensive correspondence (for we have an extensive practice in every part of the United States and Canada), dictaphones are employed, to which replies are dictated, recording the words of the speaker. Afterwards the letters are written out in full, on up-to-date type-writing machines, which print them in a plain, legible style.

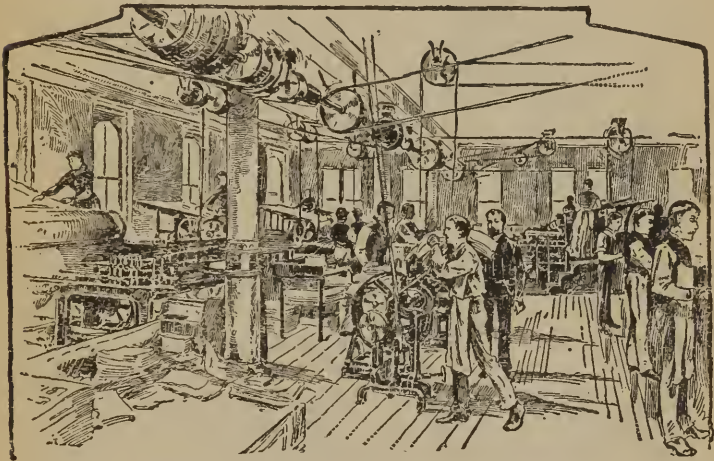
These machines are operated as rapidly as a person can think of the letters which compose a word, each operator thus accomplishing the work of several copyists. This system, by which we are enabled to correspond with our patients as rapidly as we can talk, has been rendered necessary by the growth of our business, which has attained immense proportions, giving rise to so large a correspondence that a dozen physicians cannot possibly conduct it all and give each patient's case careful attention, without the employment of dictaphones and all other facilities which modern invention has given us. By the adoption of these various means, we are enabled to fully meet the demands of the afflicted, and give every case the most careful attention.

As many persons, particularly young men and women having catarrh or almost any other chronic disease, especially if of the urogenital organs, are very sensitive and fearful that somebody will know that they are afflicted and employing medical treatment, precautions are taken that none who consult us may incur the least risk of exposure. Although none but the most honorable and trustworthy gentlemen are employed as assistants, yet as a *guarantee* of perfect security to our patients, that every communication, whether made in person or by letter, will be treated as *sacredly confidential*, each professional associate, clerk, or assistant, is required to take a solemn oath of secrecy. Great care is also taken to send all letters and medicines carefully sealed in plain envelopes and packages, so that no one can even *suspect* the contents or by whom they are sent.

### ADVANTAGES OF SPECIALTIES.

By thorough organization and a perfect system of subdividing the practice of medicine and surgery in this Institution, every invalid consulting us is treated by a specialist—one who devotes his undivided attention to the particular class of diseases to which his or her case belongs. The advantage of this arrangement must be obvious. Medical science offers a vast field for investigation, and no physician can, within the limit of a single life-time, achieve the highest degree of success in the treatment of *every* malady incident to humanity. A distinguished professor in the medical department of one of our universities, in an address to the graduating class, recently said: "Some professional men seem to be ashamed unless they have the character of universal knowledge. He who falls into the error of studying everything will be certain to know nothing well. Every man

must have a good foundation. He must, in the first place, be a good general practitioner. But the field has become too large to be cultivated in its entirety by any individual; hence the advantage of cultivating special studies in large towns, which admit of the subdivision of professional pursuits. It is no longer possible to know everything; something must be wisely left unknown. Indeed, a physician, if he would know anything well must be content to be profoundly ignorant of many things. He must select something for special study, and pursue it with devotion and diligence. This course will lead to success, while the attempt to do everything eventuates unavoidably in failure.



A Corner in Printing Department.—World's Dispensary.

Let there be single hands for special duties." Our Institution is the only one in this country in which these common-sense-ideas are *thoroughly* carried out. The diversified tastes and talents of physicians cause each to excel in treating some one class of diseases, to which he devotes more attention and study than to others. One medical student manifests great interest in the anatomy, physiology, pathology, and treatment of diseases of the eye. He becomes thoroughly familiar with all the minutest details relative to that organ and its diseases, and so thoroughly qualifies himself in this branch of knowledge that he is able to cure an inflammation or other affection of the eye in a very short time. Another student is more interested in some other class of diseases, for the study of which he has a liking, and neglects to

inform himself in the ophthalmic branch of medical and surgical science. If after engaging in the practice of his chosen profession, he is consulted by persons suffering from diseases of the eye, he tortures them with unnecessary and oftentimes injurious applications, clumsily and carelessly made, and, as the result of such unskillful treatment, the inestimable blessing of sight may be sacrificed.

The great majority of physicians allow acute maladies, diseases of children, and the practice of midwifery, to engross most of their time and attention. They manifest an absorbing interest



Operating Room for Gynecologist at Invalids' Hotel.

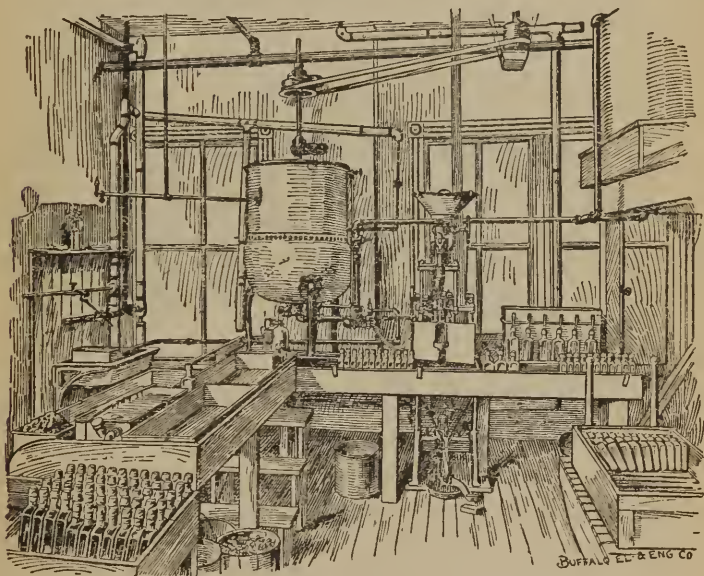
in everything that relates to these subjects, and devote little or no time to acquiring an intimate knowledge of the great variety of chronic maladies which afflict mankind. They acquire skill and reputation in their favorite line of practice, but are annoyed if consulted by one suffering from some obscure chronic affection, usually turn the invalid off with a very superficial examination, and, perhaps, only prescribe some placebo,\* apparently indifferent as to the result, but really desiring thus to conceal their lack of familiarity with such diseases. The specialist, the treat-

\*A placebo is a harmless and valueless prescription, which physicians sometimes make merely to gratify the patient, as a dose of "bread pills," etc.

ment of chronic diseases being his vocation, is equally annoyed if consulted by those suffering from acute diseases, but does not pursue the inconsistent course of assuming to treat them. He refers them to those of his medical brethren whose daily dealings with such cases make them, in his way of thinking, more competent than himself to render valuable service to such sufferers. He recognizes the fact that no man is likely to succeed in any line of study or business for which he possesses no talent or relish, nor does he believe in being a "jack-at-all-trades and master of none."

### ADVERTISING.

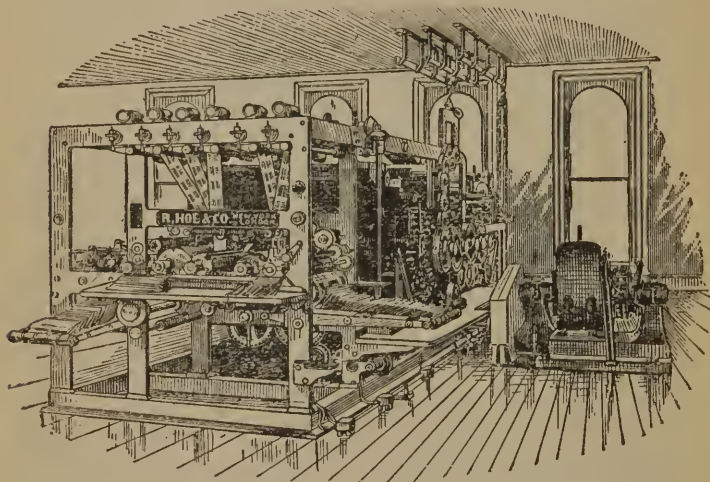
Having thoroughly qualified himself for the practice of some particular branch of the healing art, the specialist sees no im-



Bottling Department.—World's Dispensary.

propriety in acquainting the public with his ability to relieve certain forms of suffering. He believes that medical men should possess equal rights with other business men, and that any code of medical ethics which would deprive him of any of the sacred rights guaranteed to all by the liberal laws of the country, is professional *tyranny*, and merits only his contemptuous disregard. Nor does he display any false modesty in the *manner* of

making known his skill. He maintains that he has an undoubted right to place his claim to patronage before the public by every fair and honorable means. He recognizes the display of goods in the merchant's show-windows as no less an advertisement and in no better taste than the publication of a card in the newspaper. So, likewise, he regards the various devices by which the extremely *ethical* physician seeks to place himself conspicuously before the public, as but so many ways of advertising, and as not more modest than the publication of cures actually performed, or than his announcement through the public press of his professional resources for treating certain maladies.



Large Hoe Press specially built for World's Dispensary.

The physician who expresses a "holy horror" of the "*advertising doctor*," liberally bestowing upon him the epithet of "quack," announces *himself* a graduate, talks learnedly and gives notice to the public in *some* way that he is ready to serve them. He endeavors to impress upon the mind of the patient and family his skill, frequently exaggerates as to the extent of his practice, rides furiously about when he has no professional calls, keeps up business appearances by driving several horses, or joins influential societies. He may make a great display in style, manner, dress, pretensions, writing for the newspapers, exhibiting literary pedantry, referring to the superior facilities afforded by some particular school or society to which he belongs; or by editing and publishing a medical journal, ostensibly for the

advancement of medical science, but practically to display titles or professorships, to publish reports which flatteringly allude to cases he has treated, the number of capital surgical operations he has performed, or the distinguished families he is treating. All these are but *modes of advertising* professional wares; in short, are artful, though not refined, tricks, resorted to for private announcement. We say to all such adventures in modern advertising diplomacy, that these indirect, clandestine methods are not half so candid and honorable as a direct public statement of the intentions and proposals of a medical practitioner, who thereby incurs an individual responsibility before the law and his fellow-men.

No good reason has ever been assigned why any well educated physician, trained in the school of experience until he becomes proficient in medical skill, may not publish facts and evidence to disclose it, especially when these are abundant and conclusive. The following extracts from an able article by the Rev. THOMAS K. BEECHER embodies a sound view of the subject of medical advertising. He says:

\* \* \* "I am glad that the doctor cured him; I am glad that the doctor put it in the paper that he could cure him. And if any doctor is certain that he can cure such diseases and don't put it in the paper, I am sorry. What a pity it would have been had this doctor come to town with his wealth of science and experience and gone away leaving him uncured! What a pity it would have been if he had been so prejudiced against advertising as to read the responsible certificate of the doctor and give him the go-by as a quack! What are newspapers for, if not to circulate information? What more valuable information can a newspaper give than to tell a sick man where he can be cured? If a man has devoted his life and labor to the study of a special class of diseases, the necessity of his saying so becomes all the more pressing. His *duty* to advertise becomes imperative.

"When I was in England, I found on all the dead walls of London, placards, declaring that Dean Stanley, Chaplain to the Prince of Wales, would preach at such a place; that his grace the Archbishop (I think) of Canterbury would preach at another time and place; again, that an Oxford professor would preach. In short, religious notices were sprinkled in among the theater bills, and the highest church dignitaries were advertised side by side with actors, singers, and clowns. Of course, I was shocked by it, but in a moment I bethought me—if it be all right and dignified to hire a sexton to ring a bell when the minister is going to preach, it is all the same to silence the bell and hire a bill-sticker to tell the same news, the essential thing being to tell the truth every time. The remedy for the lying advertisements is for honest men to tell the truth. 'When iniquity cometh in like a flood, then the spirit of the Lord lifts up the standard.' A really able man, whatever be his gifts, makes a great mistake if he fail to use those gifts through want of advertising."

If a physician possesses knowledge that enables him to remedy diseases heretofore regarded as incurable, what virtue or modesty is there to "hide his light under a bushel"? In this free country the people think and act for themselves, and hence all have a deep concern in the subject of health. The strong popular prejudice against the doctors who advertise is due to the fact, that by this method so many ignorant charlatans are enabled to palm off their worthless services upon the uneducated and credulous; but the practice of such imposition should not cause a



One of the Operating Rooms—Invalids' Hotel.

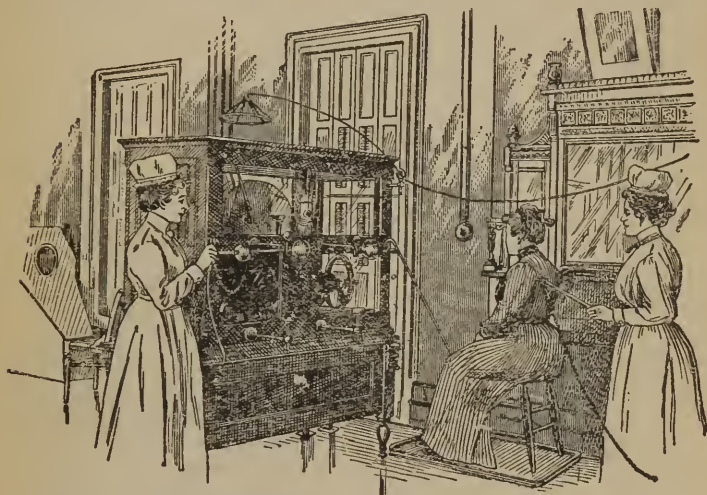
presumption against the public announcement of real skill, for the baser metal bears conclusive evidence that the pure also exists.

Every step in scientific investigation, every proposition which relates to the interest and happiness of man, every statement and appeal involving a valuable consideration, must be submitted to the scrutiny and judgment of individual reason; for every person has the right to form his own conclusions, and justify them by experience. Those claims which are only supported by empty assertion are very doubtful. Misty theories vanish before the sun of truth. He who renders professional services cannot be successful, unless he be sustained by real merit.

## TREATING PATIENTS WHO RESIDE AT A DISTANCE.

We can treat many chronic diseases as successfully without as with a personal consultation, as our vast experience enables us to correctly determine the malady from which the patient is suffering, from a history of the symptoms, and answers to questions furnished. We have not seen one person in five hundred of those whom we have cured.

Some may suppose that a physician cannot obtain, through correspondence, a sufficiently accurate idea of the condition of a



Electro Therapeutical Apparatus.—Invalids' Hotel and Surgical Institute.

patient to enable him to treat the case successfully; but a large experience in this practice has proved the contrary to be true, for some of the most remarkable cures have been effected through the medium of correspondence. In most long-continued cases, the patient has thought over his symptoms hundreds of times. The location of every pain, whether acute or mild, constant or occasional, and the circumstances under which it occurs, have been carefully noted. He has observed whether he had a rush of blood to the head, was feverish or chilly, whether troubled with cold hands and feet, whether full of blood, or pale and bloodless; and he states these matters with accuracy and common sense when writing to us, for he has a very good, if not a professional, knowledge of the relative importance of these symptoms. So in regard to digestion, he states what kinds of food

agree with him, or whether he is troubled with excessive acidity or a flatulent condition of the stomach. He also informs us whether his tongue is coated and bilious, or clean and healthy, and gives many other particulars too various to enumerate, by which we are enabled to gain a perfect understanding of the case. If his description be not sufficiently complete to enable us to obtain a definite understanding of the case, he is requested to



Application of the Violet Ray and Arc-Light at Invalids' Hotel.

answer a list of important questions which are sent him. The people are far more intelligent in these matters than physicians are generally willing to admit. A patient is often confused while being personally examined by a physician, and gives imperfect or incorrect answers. After he has left the presence of the physician, he finds that he has failed to enumerate many of the most important symptoms. In consulting by letter, the patient is not embarrassed, he states the exact symptoms, and carefully reads over the letter to see if it is a complete and accurate description of his sufferings. In this way he conveys a much better idea of the case than if present in person, and subjected to the most thorough questioning and cross-examination. The timid lady

and nervous young man write just as they feel; and one important reason why we have had such superior success in treating intricate and delicate diseases, is because we have obtained such true and natural statements of the cases from these letters, many of which are perfect pen-pictures of disease. As bank-tellers and cashiers, who daily handle large quantities of currency, can infallibly detect spurious money by a glance at the engraving or a touch of the paper, so the experienced physician, by his great familiarity with disease, becomes equally skilled in detecting the nature and extent of a chronic malady from a written description of its symptoms.

### URINARY SIGNS.

A careful microscopical examination and chemical analysis of the urine is a valuable aid in determining the nature of many chronic diseases, particularly those of the nervous system, blood,



Monocular Microscope used at the Invalids' Hotel and Surgical Institute.

liver, kidneys, bladder, prostate gland and generative organs. This important fact is not overlooked at the Invalids' Hotel and Surgical Institute, where an experienced chemist is employed to make such examinations and report the result to the attending physicians. Medical authors, professors, and practitioners of all schools, admit and even insist upon the importance of such examinations in diagnosing diseases. Many practitioners neglect to take advantage of this invaluable aid, while others fear that if they attach much importance to such examinations they will be ranked with "uroscopian" or "water" doctors, a class of enthusiasts who claim to be able to correctly diagnosticate

every disease by an examination of the urine. Persons consulting us and wishing to avail themselves of the advantages afforded by these examinations can send small vials of their urine. The vials should be carefully packed in saw-dust or paper and enclosed in a light wooden box. All charges for transporta-

tion must be prepaid, and a complete history of the case including the age and sex of the patient, must accompany each package, or it will receive no attention. This saves valuable

Fig. 1.



time by directing the examination into the channels indicated, thus avoiding a lengthy series of experiments. As we are daily receiving numerous vials of urine, every sample should, to prevent confusion, be labeled with the patient's name.

There is a natural, definite proportion of the component elements of every solid and fluid of the human body.

These proportions have been reduced to definite standards, a deviation from which affords evidence of disease. Thus, there being a fixed standard in a normal proportion of the elements of the blood, any deviation from it, as in anæmia, leucocythæmia, etc., indicates disease. So also the standard proportion of the urinary elements being known, any considerable change, either in quantity or quality of its parts, bears unmistakable evidence of disease. The invention of the microscope has provided increased facilities for detecting diseases by examination of the urine. By the aid of this wonderful instrument, we are enabled to discover with absolute certainty the various urinary deposits characteristic of different maladies. The microscopic examination of the

Fig. 2.



urine, notwithstanding the distaste, and even contempt, which many physicians manifest for such investigations, is pursued at the Invalids' Hotel and Surgical Institute, with inestimable ben-

efit to our patients. It has revealed the existence of many serious affections, which, with all our other modes of investigation, we might have been unable to detect. It has also thrown light upon many obscure chronic diseases.

Fig. 3.



In Fig. 1 highly magnified urinary deposits, which indicate impairment of the digestive functions, are represented. The crystals are composed of oxalate of lime and appear in the different forms shown in the five sections, of octahedral, decahedral, round and dumb-bell shapes. The latter are formed in the kidneys, and are

sometimes discovered adhering to casts.

The various forms of gravel, Bright's disease of the kidneys, hæmaturia, inflammation of the kidneys and bladder, diabetes, and other functional and organic diseases of the urinary organs effect characteristic changes in the urine, thus enabling us to distinguish them with certainty and exactness. Some of the various microscopical appearances of the urinary deposits in diseases of the kidneys and bladder, are represented in Fig. 2. In division A is represented pus and mucus, with decomposition, indicating suppuration somewhere along the urinary tract. In B pus globules are alone represented. In the division marked C are shown blood corpuscles as they are arranged in blood drawn from a vein or artery. D represents the same separated, as they always are when present in the urine. In E highly magnified oil globules are represented. If present in the

Fig. 4.



urine, they indicate disease of the kidneys. In F are represented epithelial cells, the presence of which in large numbers is indi-

Fig. 5.



cative of diseases of the mucous lining of the urinary organs.

Earthy phosphates are often mistaken for pus and also seminal fluid. Phosphates are always found in decomposed urine, otherwise they indicate brain affections, acute cystitis, etc. Experience has taught us that the voiding of urine loaded with phosphates is a forerunner of cystitis, or enlargement of the prostate gland, or both. In fact, per-

sons so affected are "prone to serious consequences from mild attacks of almost any and every acute disease."

Fig. 3 represents the microscopic appearance of mixed urinary deposits. In division A is represented fermentation spores as they appear in diabetic urine. Pasteur asserts that the germs of this fungus get into the urine after it has been passed. Urates appear in division B. These indicate waste of flesh, as in fevers, consumption, prolonged physical efforts, etc. Division C pictures urates of ammonia. These appear in alkaline decomposition of the urine; it is isomeric with uric acid in acid urine. In division D is represented urate of soda, which is present in the tissues of persons suffering from gout. The crystals shown in division E consist of the same salt.

Fig. 6.

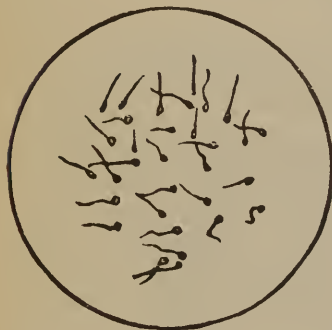


In Fig. 4 division A, is represented purulent matter as it appears in the urine. The formation of pus in different parts of

the genito-urinary system is accompanied by the appearance of pus corpuscles in the urine. When fat globules, represented in division B, are found in the urine, they indicate fatty degeneration. In division C are representations of the cells found in the urine of persons suffering from cystitis or other inflammatory diseases.

Fig. 5 divisions A and B, represent different forms of cystine. Fortunately this substance is rarely found in the urine. When present however it indicates liability to [or the actual presence of] a calculus or stone in the bladder. In division C is a representation of the deposits seen in the urine of those who are greatly debilitated. In division D are seen epithelial cells mixed with mucus.

Fig. 7.



In Fig. 6 division A, are represented the caudated cells from the deep structure of the bladder. The cells represented in division B are amyloid concretions, found where there is an enlarged prostate gland.

Fig. 7 represents the appearance of spermatozoa as seen in the urine. When present, they afford indisputable evidence of the escape of semen in the renal excretions.

We might add many other illustrations of urinary deposits and state their several indications, but a sufficient number has been introduced to show the importance and practical value of microscopic examinations of the urine in revealing obscure diseases.

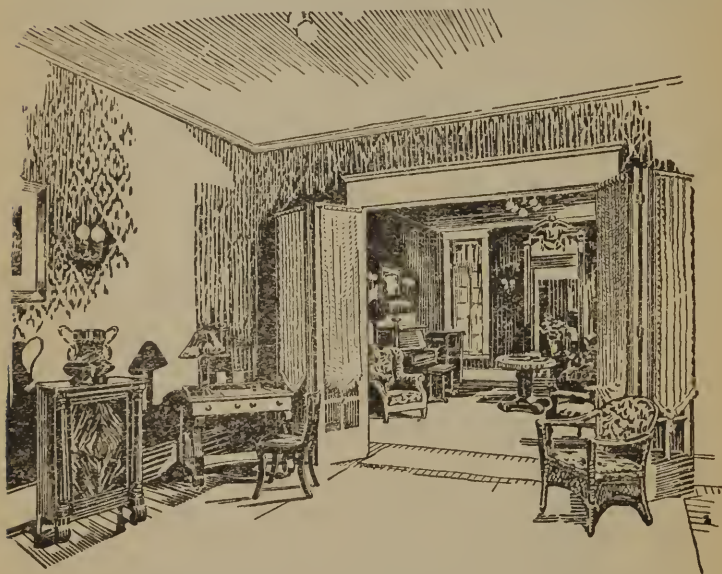
Although the microscope is of inestimable value in examining the renal excretion, it does not entirely supersede other valuable instruments and chemical re-agents in determining constitutional changes. By the urinometer we determine the specific gravity of the urine; by the use of litmus its acid or alkaline reaction is ascertained; while various chemicals, when added to it, produce certain specific changes, according to the morbid alterations which it has undergone by reason of disease. By the application of heat, or the addition of a few drops of nitric acid, the albumin, which is invariably present in Bright's disease of the kidneys, is coagulated. By the employment of other re-agents we may determine the presence of sugar—a characteristic of diabetic urine. And thus we might mention almost innumerable chemical

tests by which the several changed conditions of the urine, *characteristic* of different diseases, may be ascertained with *absolute certainty*.

### EMINENT MEDICAL AUTHORITIES ENDORSE IT.

Dr. Eberle, a distinguished allopathic author, thus writes: "Whatever may be the disease, the urine seldom fails in furnishing us with a clue to the principles upon which it is to be treated."

Dr. Braithwaite also says: "We can arrive at a more accurate



Ladies' Parlor.—Invalids' Hotel and Surgical Institute.

knowledge respecting the nature of diseases from examining the urine than from any other symptom."

Golding Bird, whose writings are regarded as sound and practical by the most learned of the medical profession, says: "The examination of the urine in disease is now regarded as one of the most important aids in diagnosis, and which it would be injurious alike to the welfare of the patient and the credit of the practitioner to avoid."

While we recognize the importance of examining the urine as an aid in distinguishing diseases, and have made this

method of diagnosis a special study, yet we do not claim that *all* diseases can be unmistakably distinguished by such examinations *alone*. We take a conservative position and have no confidence in that class of ignorant fanatics whose pet hobby is "uroscopy."

From every person who solicits our professional services, we require explicit answers to numerous important questions, that we may know the age, sex, vocation, etc., as well as the prominent symptoms manifested.

### CONSULTATIONS BY LETTER.

Formerly, we published in this book a very extensive list of questions to be answered by those consulting us, but a large experience has convinced us that beyond requiring answers to a few leading questions, which we still retain, it is better to let the patient describe the malady in his or her own way and language. After receiving and considering such a history, if we do not fully understand the patient's malady, we will ask such further questions as may be necessary. The patient should however, in addition to writing name, post-office, county, and state, *plainly*, state the name of the town containing the nearest express office. Next give age, sex, whether married or single, complexion, height, present and former weight, if known, and occupation. State also if you have been a hard worker, and whether it is necessary for you to labor hard now, how long you have been out of health, and from what particular symptoms you suffer most. Follow this with a history of your case in your own language.

### FREE CONSULTATION.

We now make no charge for consultation by letter, but instead of the one dollar formerly charged by us as a consultation fee, as we are desirous of making our facilities for treatment known to invalids far and near, we request that all persons writing to us for advice send us the names of all those within the circle of their acquaintance who are in any way in need of medical or surgical treatment for chronic diseases. If convenient, send the list on a separate piece of paper.

### CHARGES MUST BE PREPAID.

Should you send a vial of urine for analysis, about a cupful will do, and if sent by express *all express charges on it must be prepaid*.

We have received hundreds of samples through the mails safely when put in homœopathic or other *small* vials, well corked and carefully packed in a light tin can or *wooden* box, or in a light pine stick bored out hollow, the vial being carefully packed in sufficient sawdust or blotting paper to absorb all liquid should the vial get broken. Send about two ounces of the first urine that is passed after rising in the morning.

### OUR TERMS FOR TREATMENT

require the payment of monthly fees, in advance, which entitles the patient to medicines specially prepared for and adapted to his or her particular case, and to all necessary attention and advice. Our fees for treatment are moderate, varying according to the nature and requirements of each particular case, and will be made known at the time of consultation.

### WHY OUR FEES ARE REQUIRED IN ADVANCE

We receive applications from strangers residing in all parts of America, and even in foreign countries, and it is not reasonable to suppose that credit could be dispensed so indiscriminately. It would not be a correct business transaction for a merchant to send a barrel of sugar or a roll of cloth to a stranger living hundreds of miles away, to be paid for when used. Our knowledge and medicines constitute our capital in business, and an order upon that capital should be accompanied with an equivalent. Some applicants refer us to their neighbors for a testimonial of their integrity. We cannot spare the time or employ assistants to make such inquiries for the sake of trusting any one. Should credit be thus indiscriminately given, there would necessarily be losses, and, to compensate for these, and the extra expense incurred by the employment of assistants, our fees would have to be much larger, thereby imposing the burden upon those who *do* pay. Instead of following this method of procedure, we place professional services within the reach of all, so that a greater number may be benefited. Many invalids

say that they have paid large sums of money to medical men for treatment without obtaining relief. Unfortunately our land is cursed with quacks and unprincipled practitioners, who seek no one's good but their own, and it is a defect in our law that it permits such swindlers to go unpunished. Not so reprehensible is the family physician who fails, because his limited and varied practice does not permit him to become proficient in treating chronic diseases.

We are warranted in saying that our responsibility and disposition for fair dealing are known to many of the principal mercantile houses, as well as to all prominent American editors. We also refer to our present and former patients, one or more of whom may be found in almost every hamlet of America. To all who are under our treatment we devote our highest energies and skill, fully realizing that an untold blessing is conferred upon every person whom we cure, and that such cures insure the permanency of our business. On the contrary, we realize how unfortunate it is for us to fail in restoring to health any person whom we have encouraged to hope for relief. We are careful, therefore, not to assume the treatment of incurable cases, except when desired to do so for the purpose of mitigating suffering or prolonging life; for we never wish to encourage false hopes of recovery.

#### TERMS FOR BOARD AND TREATMENT AT THE INVALIDS' HOTEL AND SURGICAL INSTITUTE

are moderate, varying with the nature of the case and the apartments occupied. At times so great is the number applying to avail themselves of the skill of our Faculty, and the advantages which our Institution affords, that we are unable to receive all applicants. To be sure of securing good apartments, it is well to engage them sometime ahead, and make an advance payment of fifty dollars or more upon them, which will be refunded in case acute sickness or any similar cause should prevent the patient from occupying them at the time specified. Complete terms for treatment and

board can be arranged only when personal application for entrance to the Institution is made, and the nature and extent of the disease and the necessary treatment fully determined by personal examination of the case. If satisfactory terms and arrangements cannot at that time be agreed upon, or if the case be deemed incurable, any advance payments that have been made to secure good apartments will be promptly refunded.

### SPECIAL ADVICE.

Those coming here to consult us personally, should bring the money to pay for our services and for board and care while remaining here, in the form of drafts on New York City, Boston or Chicago, and *not* in the form of checks on a local or home bank. Such drafts can be purchased in the home bank by paying a small amount for the exchange. If more convenient, post office orders payable at Buffalo post office will do.

### TO PHYSICIANS

wishing to consult us in intricate cases of chronic diseases under their treatment, we desire to say that we shall, as in the past, take pleasure in responding to their solicitations. We have all the necessary instruments and appliances required in executing the most difficult surgical operations, and, we have had much experience in this department, we are always ready and able to assist physicians who do not practice operative surgery. In this age of railways and telegraphs medical and surgical aid can be summoned from a distance and promptly obtained.

### OUR MEDICINES

as put-up for sale through druggists, are not recommended as "cure-alls," or panaceas, but only as superior remedies for certain common and easily-recognized diseases. They are our favorite prescriptions, improved and perfected by long study and a vast experience in the treatment of chronic diseases, and have gained world-wide celebrity and sale. We are well aware that there are many chronic diseases that can only be successfully treated and cured by careful adaptation of remedies to each individual case. This is especially true of the ever-varying and delicate diseases of the kidneys and bladder. It is not less so with reference to nervous debility, involuntary vital losses, with which so many young and middle-aged men are afflicted; and we may also include in this list epilepsy or fits, paralysis or palsy, obstinate gleety discharges, and many other chronic and delicate ail-

ments of which our staff of physicians and surgeons treat many thousands of cases, but *for which we do not recommend* any of our put-up, ready-made, or proprietary medicines.

### NOT CONFINED IN PRESCRIBING.

Our physicians, in the treatment of cases consulting us, prescribe just such medicines as are adapted to each particular case. *They are not confined in the least* to our list of a few put-up or proprietary medicines (valuable as they are when applicable to the case) but resort to the whole broad range of the *materia medica*, employed by the most advanced physicians of the age. They are not hampered by any school, *ism* or "*pathy*."

### OUR MEDICINES ARE PREPARED WITH THE GREATEST CARE.

The medicines employed are all prepared in our own Laboratory by skilled chemists and pharmacists, and the greatest care is exercised to have them manufactured from the freshest and purest ingredients. Our Faculty probably employ a greater number and variety of native roots, barks, and herbs, in their practice than are used in any other invalids' resort in the land. Using vast quantities of these indigenous medicines, we can afford and do not neglect to have them gathered with great care, at the proper seasons of the year, so that their medicinal properties may be most reliable. Too little attention is generally paid to this matter, and many failures result from the prescribing of worthless medicines by physicians who have to depend for their supplies upon manufacturers who are careless or indifferent in obtaining the crude plants and roots from which to manufacture their medicines for the market. While depending largely upon solid and fluid extracts of native plants, roots, barks, and herbs, in prescribing for disease, yet we do not use them to the exclusion of other valuable curative drugs and chemicals. We aim to be unprejudiced and independent in our selection of remedies, adopting at all times a rational system of therapeutics. This liberal course of action has, in a vast experience, proved most successful.

### INVALIDS' HOTEL,

665 MAIN STREET, BUFFALO, N. Y.

# VOCABULARY

Below we give the definition of technical words. In case a word will not permit of a short definition, reference is made to the page in this book where a full description of its meaning may be found.

## A

**Abdomen.** The part of the body between the diaphragm and pelvis, containing the stomach, intestines, etc.

**Abdominal.** Belonging to the abdomen.

**Abortion.** Expulsion of the foetus before the seventh month of pregnancy.

**Absorbent.** Taking up by suction. Imbibing.

**Absorption.** The function of taking up substances from within or without the body.

**Abstinence.** Temperance. Abstain—to go without.

**Accessory.** An adjunct—accompaniment. **Accessory Glands.**

**Acid.** Sour. A compound of an electro-negative element with one or more hydrogen atoms that can be replaced by electropositive atoms.

**Acene.** Pimples upon the face, more common at the age of puberty.

**Adipose Tissue.** A thin membrane composed of cells which contain fat.

**Afferent.** Conducting inward toward the center or to some part or organ.

**Afferent Nerves.** Sensory nerves, which transmit motor impulses.

**Affusion.** A pouring upon, as water on the body.

**Agent.** A substance that produces changes in the body.

**Albumen in Urine.** In chemical composition resembles the white of an egg, and is detected by the application of heat, nitric acid, etc.

**Alcohol.** Rectified spirits.

**Alkali.** An electropositive substance combining with an acid to form a neutral salt.

**Amaurosis.** Blindness.

**Ambrine.** A dressing for burns.

**Amorphous.** Formless — non-crystallized.

**Analogy.** Similitude. Similarity of properties.

**Analyzed.** Separated—investigated.

**Anæmia.** Privation of blood. Lack of red corpuscles in the blood.

**Anatomy.** The science of organic structure.

**Anodyne.** A medicine relieving pain.

**Anthropoid.** Manlike.

**Anthropology.** The science of man.

**Antidote.** An agent counteracting the action of poison.

**Antiseptic.** Preventing or destroying putrefication.

**Anus.** The circular opening at the end of the bowel, through which the excrement leaves the body.

**Aperient.** Laxative, opening.

**Aphasia.** Loss of speech.

**Apoplexy.** The effects of a sudden rush of blood to an organ; as the brain, lungs, etc. Brain pressure, from rupture of a blood vessel.

**Appendicitis.** Inflammation of the appendix vermiformis.

**Aqueous Humor.** Clear fluid contained in the front chamber of the eye.

**Artery.** A vessel carrying blood from the heart to the various parts of the body; usually red in color.

**Articulation.** A joint or an arthrosis. Distinct, clear. The articulation of words.

**Artificial Respiration.** Method used to restore natural breathing by means of the Schaefer method. See p. 71.

**Arterial.** Pertaining to the arteries. Arterial blood.

**Arteriosclerosis.** The hardening of the arterial walls. See pages 320, 339, 402.

**Arthrosis.** An articulation or a jointing; a suture.

**Asafetida.** A fetid gum-resin from the root of several species of *Ferula*. It is antispasmodic.

**Asphyxia.** A condition of apparent death owing to the supply of air being cut off; as in drowning, inhalation of gases, sunstroke, etc.

**Assimilation.** Appropriating and transforming into its own substance, matters foreign to the body.

**Asthma.** Difficulty of breathing.

**Astigmatism.** A condition of the eye in which rays of light from a point do not converge to a point on the retina.

**Astringents.** Medicine which contract the flesh.

**Auditory Nerves.** The nerves connecting the brain with the ears and employed in exercising the sense of hearing.

**Auricle.** External ear.

**Auscultation.** A method of determining the condition of an organ by listening to the sounds produced by it. **Auscultation Tube**—a stethoscope.

## B

**Bacteria.** Micro-organisms, microbes.

**Bacteriologist.** One versed in Bacteriology.

**Bacteriology.** The science of micro-organisms.

**Basement Membrane.** A thin layer of flattened almost indistinguishable connective tissue cells that serves as a basis for the epithelium in mucous membranes. (See epithelium)

**Belladonna.** A poisonous plant, used as an anodyne, an antispasmodic and a mydriatic.

**Bile.** A yellow bitter fluid secreted by the liver.

**Biliary Calculus.** Gall Stones.

**Bilious.** Disordered in respect to bile. Relating to bile.

**Biology.** The science of life or living organisms.

**Bi-valve.** Having two valves.

**Bladder (Urinary).** The organ, situated behind the pubic bone, which holds the urine until its expulsion.

**Blood.** The fluid that circulates in the heart, arteries, veins and capillaries.

**Body.** The animal frame with its organs.

**Boil.** An abscess which comes to a head and discharges matter and a core.

**Bone.** The hard tissue forming the framework of the body.

**Bowels.** The Intestines.

**Brain.** The contents of the cranium especially the cerebrum.

**Bright's Disease.** A disease of the kidneys.

**Broad Ligaments of the Uterus.** Folds of the peritoneum which support the womb and contain the Fallopian tubes and ovaries.

**Bronchia.** Tubes formed by the division of the windpipe.

**Bronchial Catarrh, or Bronchitis.** Inflammation of the lining membrane of the large bronchial tubes.

## C

**Calcium.** A metal—the basis of lime. Calcium deposits.

**Calculus, Calculi.** Stones or similar concretions formed by the deposit of solid matter; of lime, soda, uric acid, urates, oxalates, etc.

**Caliber.** The internal diameter of a tube, as of an artery.

**Calisthenics.** Healthful exercise of the body and limbs, for purposes of strength and agility.

**Calomel.** A drug.

**Cancer.** A malignant tumor.

**Canker.** Ulcers in the mouth.

**Capacity.** Ability, Cubic extent, Vital, the volume of air that can be expelled after a full inspiration.

**Capillaries.** Small blood vessels.

**Carbonic Acid.** A heavy, poisonous gas. Choke damp.

**Carbuncles.** See boils.

**Cardiac.** Pertaining to the heart. Near or towards the heart.

**Carminatives.** Medicines which allay pain in the stomach and intestines by expelling the gas.

**Carotids.** The great arteries at the sides of the neck.

**Cartilage.** A solid part of the body found in the joints, ends of the ribs, etc. It is softer than bone but harder than ligament.

**Catalytics.** Medicines which destroy morbid agencies in the blood. Alteratives.

**Catamenia.** Monthly flow of the female.

**Cataract.** Opacity of the lens of the eye, or its covering, or both.

**Catgut.** A ligature—substance made from the intestines of sheep.

**Cathartics.** Medicines which cause evacuation of the bowels.

**Catheter.** A hollow tube introduced into the bladder through the urethra for the purpose of drawing off the urine.

**Caustics.** Substances which destroy animal tissue.

**Cautery.** A substance or instrument for burning or disorganizing a part.

**Cellular.** Pertaining to, or like a cell or cells. Cellular structure—cells communicating, forming a structure resembling "lattice work."

**Cephalic.** Pertaining to the head.

**Cerebellum.** Little Brain situated in the posterior chamber of the skull. Base brain. (See Chapter 25).

**Cerebral.** Relating to the brain.

**Cerebritis.** Cerebral inflammation.

**Cerebro-Spinal Axis.** The brain and spinal cord. It lies in the cavities of the skull and the spinal column.

**Cerebrum.** The chief position of the brain.

**Ceruminous Glands.** Pertaining to or producing. Cerumen—ear-wax.

**Cervical Endometritis.** Inflammation of lining of the womb.

**Cervix.** The neck. Any neck-like part. Cervix uteri—neck of the uterus (womb). Cervix vesicae—neck of the bladder.

**Chalk.** Carbonate of Lime. Chalk-stone, gout-stone an articular deposit.

**Chemistry.** The science of substances.

**Chest.** The Thorax. The upper portion of the body.

**Chill.** A shivering sensation.

**Cholera.** A disease characterized by emesis, diarrhea, cramps and prostration.

**Chronic.** Long continued.

**Chyle.** Food digested and ready for absorption.

**Chyme.** The food that has gastric, but not intestinal digestion.

**Ciliary.** Of, or pertaining to eyelashes.

**Ciliary muscle.** An involuntary muscle situated in the globe of the eye near the junction of the iris with the choroid coat.

**Circulation.** The passage of blood thru the body.

**Circulatory System.** The system in the animal economy, made up of the heart, arteries, capillaries and veins thru which the blood circulates.

**Clavicle.** The collar bone, joining the sternum and scapula.

**Clinical Thermometer.** A self-registering thermometer for taking the body temperature.

**Clot.** A coagulation.

**Coagulate.** To thicken.

**Colic or Cramps.** Gas in the intestines.

**Collapse.** Failure of the vital powers.

**Collar Bone.** (See Clavicle.)

**Colon.** The superior part of the large intestine.

**Coma.** A condition of profound sleep from which it is difficult to arouse the patient.

**Comatose.** In a condition of coma.

**Complex.** Intricate.

**Component.** Constituting—establishing.

**Compress.** Folded cloths for local pressure.

**Concave.** Hollow and rounded as the interior of a sphere or circle.

**Conception.** Impregnation of the ovum; the beginning of a new being.

**Conductor.** Any conducting medium, material or device.

**Congestion.** An abnormal amount of blood in a part or organ.

**Constant Immersion.** (See Baths, Chapter two.)

**Constituents.** Elements—Elemental.

**Consumption.** See tuberculosis. P. 425.

**Contagious.** Catching, infectious.

**Convalescence.** The recovery of health after sickness.

**Cornea.** The anterior, transparent part of the outer coat of the eyeball.

**Corpuscle.** A minute body, a cell.

**Counter-irritation.** The superficial irritation of a part of the body to produce a good effect on another diseased part.

**Cranial Nerves.** Nerves of the head.

**Cranium.** The skull—the bony case of the brain.

**Cretaceous.** Chalky.

**Croup.** Inflammation of the larynx and trachea with dyspnoea and membranous deposit.

**Culture.** Propagation of Germs in suitable fluids or other media.

**Cuspids.** Eye Teeth. The four teeth that have conic crowns.

**Cutaneous.** Belonging to, or affecting the skin.

**Cutis Vera.** The true skin.

**Cuticle.** The epidermis, outer layer of the skin.

**Cyst.** A membranous sac containing fluid.

**Cystitis.** Inflammation of the bladder. In chronic form, Catarrh of the bladder.

## D

**Debilitated.** Weakened.

**Defecation.** Voiding excrement from the body.

**Degeneration.** Deterioration in structure of a tissue or an organ.

**Degeneration, Fatty.** The deposit of particles of fat instead of the proper muscular tissue.

**Deglutition.** The act, process, or power of swallowing.

**Deleterious.** Destructive. Harmful.

**Delirium.** Mental aberration due to disease.

**Dentition.** Cutting of the teeth in infancy.

**Deposits.** Sediments. A collection of morbid particles in a body. Calcium deposits.

**Dermatitis.** Inflammation of the skin; cytitis.

**Dermatologist.** A specialist in the treatment of skin disease.

**Detergent.** A cleansing agent or drug.

**Diabetes.** Sugar in the urine.

**Diagnosis.** The recognition of a disease from the symptoms.

**Diaphoretic.** Medicines which increase perspiration.

**Diaphragm.** The muscular wall between the thorax and the abdomen.

**Diarrhea.** Morbidly frequent evacuation of the bowels.

**Digestion.** The function by which food passing along the alimentary canal is prepared for nutrition.

**Digit.** A finger or toe.

**Digitalis.** Foxglove. A genus of plants. The leaves used as a heart stimulant.

**Dilate.** To expand.

**Dilator.** An instrument for stretching a cavity or opening; also a dilating muscle.

**Diluents.** Any fluid which thins the blood, or holds medicine in solution.

**Diphtheria.** An infectious membranous throat disease.

**Discharge.** A morbid secretion. An evacuation.

**Disease.** A morbid condition of the body.

**Disinfectant.** An agent destroying germs.

**Douches.** A stream of water directed against a part.

**Dressing.** Application of bandage or other substance to a wound.

**Dropsy.** The accumulation of fluid in the cavities or cellular tissue of the body.

**Drug.** A substance used as a medicine.

**Duodenum.** The first portion of the intestines.

**Dura Mater.** A thick, fibrous membrane lining the skull.

**Dysentery.** A disease characterized by frequent, scanty and bloody stools.

**Dysmenorrhea.** Difficult or painful menstruation.

**Dyspepsia.** Impaired or imperfect digestion.

**Dyspnoea.** Difficult breathing.

## E

**Ear, Internal.** Defined on page 290.

**Eclectic.** Selecting.

**Eczema.** A skin disease.

**Edema (Œdema).** Puffiness of the skin from the accumulation of fluid. General dropsy.

**Efferent.** Carried outward, as influences from a nerve-center to muscles, the cells of glands, etc.

**Eliminated.** Discharged, expelled.

**Emaciation.** Leanness in flesh.

**Embryo.** A fecundated germ in pregnancy.

**Embryonic.** Primary.

**Emetics.** Medicines which empty the stomach upwards.

**Emollient.** An agent that softens tissues.

**Empyema.** Pus in the pleural cavity.

**Endocarditis.** Inflammation of the lining membrane of the heart.

**Endometritis.** Disease of the lining membrane of the womb.

**Enema.** A rectal injection of medicine or food.

**Enteritis.** Inflammation of the mucous lining of the small intestines.

**Epidemics.** Diseases which attack a number of persons at the same time; as yellow fever, smallpox, etc.

**Epidermis.** The outer layer of the skin.

**Epiglottis.** A cap or shield over the windpipe allowing the admission of air; but preventing the admission of foreign bodies.

**Epilepsy.** A nervous disease with loss of consciousness and convulsions.

**Epithelioma.** Cancer.

**Epithelium.** The thin covering upon the lips, nipple, mucous and serous membranes and lining the ducts, blood vessels and other canals.

**Eruption.** A breaking out. A skin disease.

**Esophagus.** Canal from the pharynx to the stomach.

**Eustachian Tube.** The tube leading from the throat to the inner ear.

**Evacuate.** Defecation. Act of emptying.

**Evacuant.** Cathartic.

**Excoriates.** Removes the skin in part.

**Excoriation.** A wound which removes some of the skin.

**Excrementitious.** Pertaining to the matter evacuated from the body.

**Excretion.** The process by which waste materials are removed from the blood performed particularly by the lungs, skin and kidneys.

**Excretory Ducts.** Minute vessels which transmit fluid from glands.

**Exhalations.** That which is thrown off by the body, as vapor, gases, etc.

**Exhaustion.** Great loss of vital power.

**Expectorants.** Medicines which promote discharges from the lungs.

**Expiration.** Expelling the breath.

**Extract.** The condensed active principle of a drug.

**Exude.** To discharge liquid. Perspiration.

## F

**Facial Nerves.** The motor nerves of the muscles of the face.

**Fallopian Tube.** The canal through which the ovum passes from the ovary to the womb.

**Faradization.** The application of electricity by inductive currents.

**Fatty Degeneration.** The deposit of particles of fat instead of proper muscular tissue.

**Febrifuge.** A medicine which abates or cures fevers.

**Febrile.** Relating to fever.

**Fever.** A rise of body temperature with associated symptoms.

**Fibrin.** A nitrogenous proteid coagulating in exposed blood.

**Fibrous.** Consisting of fibers.

**Fibroid.** Having a fibrous structure.

**Film.** A pellicle of thin skin.

**Filaments.** Fibers. Fiber, a slender thread.

**First Intention, Healing by.** Healing without suppuration or the formation of pus.

**Fissure.** A crack.

**Fits.** A convulsion; a sudden paroxysm.

**Flatulence.** The presence of gas in the digestive canal.

**Flatus.** Gas in the alimentary canal.

**Flexion of the Womb.** A partial displacement in which the womb is bent upon itself.

**Flexures.** Bending. Motion of a joint.

**Fluid Extracts.** The active principles of medicines in fluid form.

**Focus.** Central point.

**Fœtus.** The unborn child.

**Follicles (of hair).** Small depressions in the skin.

**Fomentations.** Local application of cloths wrung out of hot water.

**Forceps.** An instrument having a motion and use like the thumb and forefinger. Pincers. Obstetrical forceps embrace the head of the fœtus.

**Formaldehyde.** An inodorous surgical antiseptic. A disinfectant.

**Fracture.** Broken bone. In compound fracture the end of the bone projects through the skin.

**Fumigation.** Exposure to disinfectant vapors.

**Function.** The peculiar action of an organ, or part of the body.

## G

**Gall Stones.** Calcareous concretions in the gall-bladder and its ducts.

**Galvanism.** Electricity.

**Galvano-cautery.** Burning or searing by galvanic electricity.

**Ganglia.** Nerve centers which form and distribute nerve power.

**Gaseous.** In form of gas. Gaseous emanations

**Gastralgia.** Neuralgia of the stomach.  
**Gastric.** Pertaining to the stomach.  
**Gastric Juice.** A thin acid fluid secreted by the glands of the stomach; the chief digestive fluid.  
**Generative Organs.** Organs of reproduction.  
**Genitals.** The sexual organs.  
**Germ.** A microbe or bacterium.  
**Gestation.** Carrying the embryo in the uterus.  
**Glands.** Secretory organs.  
**Glycogen.** Animal starch found in blood and liver.  
**Granular and Cystic Degeneration.** (Forming Growths).  
**Granular Casts.** Moulds of epithelium found by the microscope in chronic Bright's Disease.  
**Gravel.** Substances precipitated in the urine resembling sand.  
**Groin.** The oblique depression between the trunk and thigh.  
**Goitre.** A disease of the Thyroid gland.  
**Gout.** A disease associated with joint inflammation, swelling—uric acid in the blood.  
**Gravitation.** The force with which all bodies attract each other.  
**Grey Matter.** The part of the brain which is responsible for mental activity.  
**Grippe or Influenza.** A contagious epidemic catarrhal fever.  
**Gustatory Nerves.** The nerves of the special sense of taste.  
**Gynecologist.** One who makes the diseases of women a specialty.  
**Gynecology.** The science of the diseases of women.

## H

**Hair Bulbs.** The expansion or root of the hair.  
**Hallucinations.** Perception or sensation of objects which do not exist; as in Tremens.  
**Hay Fever.** See page 414.  
**Heart.** The hollow muscular body, the center of the circulatory system. Vital Organ.  
**Hectic.** Constitutional; as hectic fever, in which all parts of the body become emaciated.  
**Hemiplegia.** Paralysis affecting only one side of the body.  
**Hemorrhage.** A flow of blood from the vessels.  
**Hemorrhoid.** A pile; a small blood tumor at the anal orifice.  
**Hemorrhoidal Veins.** The veins about the rectum which enlarge and form piles.  
**Hepatic.** Relating or belonging to the liver.  
**Herbiferous.** Animals that live on herbs. Vegetarians.  
**Hereditary.** A disease transmitted from parent to child.  
**Hernia or Rupture.** A weak spot in the muscular wall.

**Hiccough.** A spasmodic inspiration suddenly arrested by an involuntary closure of the glottis.  
**Hip.** The upper part of the thigh.  
**Hives.** (Urticaria, or Nettle-Rash.) See page 415.  
**Homogeneous.** Of the same nature.  
**Hook Worm.** See page 415.  
**Hyaline Casts.** Glassy appearing substances found by the microscope in urine in chronic Bright's Disease.  
**Hygiene.** The principles or rules for the promotion or preservation of health.  
**Hyperemia.** A condition of plethora.  
**Hypodermic.** Subcutaneous—applied to injections of medicine.  
**Hypochlorite of Lime.** Solution used for dressing wounds. (See illustration of Carrel Tube—Page 63).  
**Hypodermic Syringe.** An instrument having a very fine tube and needle-like point, by which medicines are lodged immediately under the skin.  
**Hypoglossal Nerves.** The motor nerves of the tongue.

## I

**Ice-bag.** A bag to contain ice for application to the body.  
**Ice-cap—Compress;** an ice bag for application to the head.  
**Ileum.** The lower half of the small intestine.  
**Immunity.** Exemption.  
**Imperforate.** Without a natural opening.  
**Impregnation.** Imparting the vital principle of the sperm-cell to the germ-cell, by which a new being is created.  
**Incipient.** Commencement; first stage.  
**Incision.** The act of cutting into.  
**Incisors.** Front teeth. The four anterior teeth in each jaw.  
**Indigenous.** Native. Grows in a country.  
**Indigestion.** (See Dyspepsia).  
**Infantile Paralysis.** Spinal paralysis in children.  
**Infection.** The communications of disease germs.  
**Infiltration.** The passage of fluid into the cellular tissue; as in General Dropsy.  
**Indolent.** Painless; a term applied to tumors.  
**Induration.** Hardening of a part or organ.  
**Infinitesimal.** Minute. Small.  
**Inhaler.** Instruments for inhalation of medicinal vapors.  
**Instrument.** A mechanical tool used in surgery.  
**Inosculate.** To blend.  
**Iodine.** A poisonous non-metallic element used in medicine as an alterative. Used largely in surgery for dressing wounds. See page 62.  
**Iodoform.** A yellow antiseptic powder used largely in medicine.  
**Iodoform Gauze** used in surgery.

**Iris.** A thin colored curtain stretched vertically across the aqueous chamber of the eye. The rainbow.  
**Iron.** A metal with important tonic properties.  
**Irritant.** An agent producing irritation.  
**Insomnia.** Sleeplessness.  
**Insoluble.** Not dissolvable.  
**Inspire.** To breathe into the lungs—inhale; as in breathing the air is alternately inspired, and expired.  
**Integral.** The whole.  
**Integument.** A covering.  
**Intercostal.** Lying between the ribs.  
**Intestine.** Digestive tube from the stomach to the anus.  
**Isolation.** Separation.  
**Itch.** (Scabies) A contagious parasitic skin disease.

## J

**Jaundice.** A yellow coloration of the skin.  
**Jaw.** Either of the two maxillary bones serving the purpose of seizing and masticating food.  
**Jejunum.** The upper two-fifths of the small intestine.

## K

**Kidney.** The organ secreting urine.  
**Knee.** Joint between the foreleg and thigh.

## L

**Labor.** Parturition; a bringing forth of young.  
**Laboratory.** The workroom of a chemist or pharmacist for experimental scientific work.  
**Labyrinth.** The cavities of the internal ear.  
**Laceration.** A wound made by tearing.  
**Lachrymal Glands.** Minute organs about the eyes which secrete tears.  
**Lacteal.** One of the lymphatics of the small intestines that take up chyle. Pertaining to milk.  
**Laminae.** Thin bones, or the thin parts of a bone.  
**Lancinating.** Acute, shooting pains fancifully compared to the pierce of a lance.  
**Larynx.** That portion of the air passage indicated in the male by "Adam's Apple."  
**Laxatives.** Medicines which move the bowels gently.  
**Leech.** A blood-sucking aquatic worm.  
**Lens.** Magnifying. A magnifying glass.  
**Lesion.** Derangement. Tearing or other division of parts, previously continuous.  
**Leucorrhœa.** Described on page 200.  
**Ligament.** A white inelastic tendon, binding bones together.

**Ligature.** A cord or catgut tied around a blood vessel to arrest hemorrhage.  
**Lint.** Scraped linen used for dressing wounds.  
**Linum.** A genus of herbs, the seeds flaxseed, or linseed used as an emollient.  
**Lips.** The two fleshy folds surrounding the orifice of the mouth.  
**Lithic Deposits.** Sediment or stone formed in the urine by uric acid.  
**Liver.** The largest glandular organ of the body secreting bile.  
**Lobes.** Round projecting parts of an organ; as lobes of the lungs, of the liver, etc.  
**Localization.** The determining of the seat of disease.  
**Loin.** The side of the body between the hip bone and ribs.  
**Lotion.** A wash.  
**Lumbago.** Rheumatism in the small of the back and loins.  
**Lumbar Vertebrae.** That part of the backbone in the vicinity of the loins.  
**Lungs.** The two organs of respiration.  
**Lymph.** A transparent fluid resembling blood found in lymphatic vessels.  
**Lymphatics.** Capillary tubes pervading the body and conveying lymph.

## M

**Malaria.** An infectious disease caused by *Plasmodium Malariae* in the blood.  
**Malformation.** Irregularity in structure.  
**Malignant.** Applied to diseases which threaten life.  
**Mammalia.** Animals that suckle their young.  
**Manganese.** A hard, brittle, grayish white metallic element used in chemical manufactures, and in the manufacture of glass and paints.  
**Manipulations.** Examination and treatment by the hand.  
**Massage.** Kneading, rubbing and stroking the surface to improve circulation and nutrition and to remove effete material.  
**Mastication.** Chewing.  
**Mastoid.** Mastoid Process. A conical prominence of the temporal bone situated behind the ear, serving for the attachment of muscles.  
**Media.** The middle coat of a vein, artery, or lymph vessel.  
**Mediastinum.** The part of the membrane which forms a partition between the lungs.  
**Medulla oblongata.** Situated just above the spinal cord and is continuous with it below and the brain above. The vital knot.  
**Melancholia.** A mild form of insanity attended with great gloom and mental depression.  
**Membrane.** A thin enveloping or lining substance.

**Membranous.** Of the nature or construction of membrane.

**Meninges.** Membranes covering the brain.

**Menopause.** The end of the menstrual life.

**Menorrhagia.** Immoderate monthly flow.

**Menses.** Monthly flow of the female. See page 190.

**Menstruation.** Function of the female producing menstrual monthly flow.

**Menstruum.** A solvent; as water, alcohol, etc.

**Mental.** Pertaining to the mind.

**Mesenteric Glands.** Glands about the peritoneum which secrete lymph.

**Mesentery.** The peritoneal attachment of the small intestines. A fold of the peritoneum that invests an intestine.

**Metric System.** A system of measurement for medicines.

**Midwives.** Females who attend women at childbirth.

**Mitral Valve.** Valve on the left side of the heart.

**Molecules.** The smallest part of a substance that can exist separately and still retain its composition and properties.

**Monomania.** Insanity on one subject.

**Muco-purulent.** Composed of mucus and pus.

**Mucous Membrane.** The thin web-like lining to the canals and cavities which secretes a fluid by which it is constantly lubricated.

**Mucus.** A mucilaginous fluid found on the surface of certain membranes which keeps them soft and pliable.

**Muscle.** The structures of the body which execute movements.

**Muscular Tissue.** The flesh forming the muscles of the body.

**Mydriatic.** Relating to or causing dilation of the pupil. A drug that is efficacious in dilating the pupil, as belladonna.

## N

**Narcotic.** A substance which relieves pain, produces sleep, and in large doses brings on stupor, coma, and even death.

**Nerve.** One of the whitish fibrous threads or cords that ramify thru the bodies of animals, and whose function is to convey sensation and originate motion.

**Nervine.** An agent calming nervous excitement.

**Neuralgia.** Pain in a nerve.

**Neuritis.** Inflammation of a nerve.

**Nitrate.** A salt of nitric acid.

**Nitrogen.** One of the gases in the atmosphere.

**Nitrogenous.** Containing nitrogen.

**Nurse.** One who takes care of the sick.

**Nutrition.** The process of assimilation of food.

**Nutritive.** Affording nutrition,

## O

**Obstetrical.** Pertaining to childbirth.

**Olfactory Nerves.** The nerves of the sense of smell.

**Ophthalmia.** Inflammation of the eye.

**Optic Nerve.** The nerve connecting the brain and eye, and employed in the sense of sight.

**Organic.** Pertaining to the structure of an organ.

**Orifice.** Opening or mouth.

**Ovaries.** Two ovid bodies situated either side of the womb.

**Ovary.** The female organ in which the ovum, or germ-cell is formed.

**Ovulation.** The formation of the germ-cell in the ovary and its release from that organ.

**Oxygen.** The vital gas of the atmospheric air.

**Oxytocic.** Hastening parturition or childbirth.

## P

**Palate.** The roof of the mouth and floor of the nose.

**Pancreas.** A fleshy gland situated between the bottom of the stomach and the vertebrae.

**Pancreatic Juice.** A colorless fluid resembling saliva secreted by the pancreas forming an important factor in digestion.

**Papilla, Papillæ.** Small, nipple-shaped prominences found on the tongue, the skin, etc.

**Paraplegia.** Paralysis affecting the upper or lower extremities of the body.

**Parasite.** An organism that inhabits another organism and obtains nourishment from it.

**Paresis.** Softening of the brain.

**Parotid Glands.** These are situated under the ear, just at the angle of the lower jaw, and secrete saliva.

**Paroxysms.** The periodical attack, fit or aggravation in the course of a disease.

**Parturient.** Bringing forth or having recently brought forth.

**Parturition.** Labor; the delivery of the fœtus.

**Pastiles.** Small medicated lozenges.

**Pathogenic.** Causing disease. Non-pathogenic—resisting disease.

**Pathology.** That part of the Science of Medicine, the object of which is the knowledge of disease.

**Pelvic.** Belonging to and relating to the pelvis.

**Pelvis.** The lower part of the abdomen or trunk, composed of bone, containing the genital and urinary organs; supports the backbone and is supported by the legs.

**Penis.** The male organ of generation.

**Pepsin.** The digestive solvent secreted by the stomach.

- Peptic.** Pertaining to the stomach.
- Peptone.** An albuminoid produced by the action of pepsin.
- Percussion.** Striking the surface and by the sound produced judging of the condition of the internal organs.
- Pericarditis.** Inflammation of the pericardium.
- Pericardium.** The membranous sac enclosing the heart.
- Perineum.** The space bounded by the end of the spine, sexual organs and the bony prominences on which one sits.
- Periostium.** The membranous covering to all bones.
- Peristaltic Motion.** A wormlike movement of the bowels by which the food is moved forward.
- Peritoneum.** The membrane (serous) which lines the abdominal cavity and surrounds the intestines.
- Peritonal.** External coat of the stomach.
- Peritonitis.** Inflammation or serous membrane lining abdominal and pelvic cavities.
- Perspiration.** Excretion of liquid from the skin.
- Pessary.** An instrument for holding the womb in its place.
- Pharmaceutical.** Anything belonging to pharmacy.
- Pharynx.** The cavity back of the mouth and palate through which the air passes when breathing and the food when swallowing.
- Phosphate.** A substance containing phosphorus.
- Phosphates, Earthy.** The white deposit in urine composed of phosphoric acid and a base.
- Phthisic.** Consumption. By some the word is used for Asthma or difficulty in breathing.
- Physics.** Natural philosophy.
- Physiology.** The science which treats of the phenomena and functions of animal life.
- Physiological Anatomy.** The branch of medicine that defines the organs of the body and their particular actions.
- Pla Mater.** The internal vascular membrane covering the brain.
- Pigment.** Paint—coloring matter.
- Pin Worms.** Minute thread creatures in the bowel. See page 421.
- Placenta.** Afterbirth.
- Plethora, Plethoric.** Full of blood; may be general or confined to a part.
- Pleura.** Membrane enveloping the lungs.
- Pleurisy.** Inflammation of the pleura.
- Pleuro-pneumonia.** Inflammation of both the pleura and lungs.
- Plexus.** A network of nerves or veins.
- Pneumogastric Nerves.** Nerves that supply certain muscles of the neck, also Glosso-pharyngeal nerves,
- Pneumonia.** Inflammation of the lungs.
- Poison.** A venomous or toxic agent.
- Polyp.** An aquatic animal—as the coral builders.
- Polypi.** More than one polypus.
- Polypoid.** Like a polypus in shape or construction.
- Polypus.** A pedunculated tumor found in the nose, ear, rectum, etc.
- Polypus.** A tumor which grows from mucous membranes, commonly found in the nasal vaginal cavities.
- Pore.** A small opening especially a minute perforation in a membrane or tissue for absorption or excretion, as the pores of the skin.
- Portal Vessels.** The cluster of veins which join and enter the liver.
- Potassium.** A metallic element.
- Poultice.** A soft emulsion for external application.
- Pregnancy.** The condition of being with child.
- Probe.** An instrument for examining wounds and cavities.
- Procreation.** Production or generation of offspring.
- Prolapsus.** A falling down of an organ through an orifice, as the womb, bowel, etc.
- Prostate Gland.** A glandular body situated around the neck of the bladder in the male.
- Proteids.** Foods composed of carbon, hydrogen, oxygen and nitrogen; as the white of an egg.
- Protoplasm.** Primitive organic cell matter; germinal matter.
- Proud-flesh.** Abnormal growths which arise in wounds or ulcers.
- Pruritus Vulvæ.** A nervous disease attended with excessive itching of the external genital parts of the female.
- Psychical.** The relation of the soul to animal experiences and being.
- Psychological.** The spiritual potencies of the soul.
- Psychology.** The science of the human soul and the operations. The science of psychic phenomena.
- Ptyalin.** Organic matter in the saliva which imparts its viscosity obtained from secretions of glands.
- Puberty.** The age at which the subject is capable of procreation.
- Pubic.** Relating to the pubes, a part above the genital organs, covered with hair at puberty.
- Puerperal Fever.** Child-bed fever.
- Pulmonary.** Relating to the lungs.
- Pulse.** The expansile impulse of the arteries.
- Pupil.** The round aperture in the iris of the eye.
- Purgatives.** Medicines which cause evacuation of the bowels.
- Purulent.** Discharging pus; as an ulcer.
- Pus.** A yellowish, inodorous, creamy secretion from inflamed parts; contained in abscesses or discharging from ulcers.

**Pustule.** A small elevation of the cuticle (or skin) containing pus—a pimple.

**Putrescent.** Decomposing offensively.  
**Pyæmia.** Blood poisoning from the absorption of decomposing pus or "matter."

## Q

**Quinsy.** An acute, severe inflammation of the tonsils, with fever.

## R

**Radical Cure.** A cure in which the disease is entirely removed, root and branch.

**Rales.** Noises produced by air passing through mucus in the lungs.

**Rash.** An eruption on the skin.

**Rectal.** Pertaining to the rectum.

**Rectum.** The lower portion of the intestines terminating in the anus.

**Recumbent.** Reclining.

**Reconvalescence.** Convalescence.

**Reflex Action.** Power of the spinal cord by which it is enabled to convert sensory into motor impulses.

**Regurgitation.** The act by which blood is forced backwards in an unnatural manner.

**Relaxation.** Diversion. Relax to slacken. Diminution of tension.

**Remission.** A temporary diminution of the symptoms of fever.

**Renal Calculus.** A stone formed in the kidney.

**Reproduction.** Producing living bodies similar to the parents.

**Requisite.** Essential.

**Residue.** That which remains.

**Respiration.** Inspiration and expiration of air by the lungs.

**Retention.** Holding back. Stoppage. Retention of urine.

**Retina.** Internal membrane of the eye.

**Retrocedent.** Moving from one part of the body to another; as gout.

**Retrocession.** Change of an eruption from the surface to the inner parts.

**Retroversion.** A change in the position of the womb in which the top falls back against the rectum.

**Revulsion.** Revulsive. Calling the blood away from the diseased part.

**Rheumatism.** A disease with fever, pain, inflammation and swelling of the joints. See page 422.

**Rib.** A thoracic bone.

**Rickets.** A disease in children characterized by crookedness of the spine and long bones resulting from scrofula or poor and insufficient food.

**Rigor.** Coldness, stiffness. Rigor Mortis—the rigidity after death.

**Rubefacients.** Medicines which produce redness of the skin.

**Rupture.** Bursting, Hernia.

## S

**Saccharine.** Like or containing sugar.

**Saliva.** The secretion of the glands of the mouth.

**Salivary Glands.** Glands yielding saliva.

**Salubrious.** Healthful.

**Sanitarium.** An institution for the treatment of the sick. A health retreat.

**Sanitary.** Pertaining to health.

**Scab.** A crust formed over a wound or ulcer.

**Scales.** The epidermis or outer part of the skin consists of minute scales.

**Scalp.** The skin covering the head.

**Scapula.** Shoulder blade.

**Scarlet Fever.** See page 422.

**Sciatic Nerve.** The great nerve of the thigh.

**Scrofulous.** Suffering from a condition of the system characterized by enlargement of the glands, eruptions, etc., with great susceptibility to contagion.

**Scrotum.** The bag of skin which covers the testicles.

**Scurvy.** A disease due to impaired nutrition.

**Sebaceous Glands.** The oil tubes of the skin.

**Secretion.** The process by which substances are separated from the blood.

**Sedatives.** Medicines which allay irritation or irritability of the nervous system.

**Sedentary.** Requiring much sitting.

**Sensibility.** The power or capacity of feeling.

**Sensory.** Conveying or producing sensation.

**Serous.** Watery. Pertaining to the serous membrane.

**Serous Tissue.** The membranes lining the closed cavities of the body, which secrete a watery, lubricating fluid.

**Serum.** The fluid constituent of the blood.

**Shingles.** See page 423.

**Shock.** Sudden depression of vitality occasioned by injury.

**Sitz Bath.** A bath in a sitting posture. See page 12.

**Sling.** A swinging bandage for a limb.

**Small-pox.** A specific infectious disease.

**Smell.** To scent.

**Soapstone.** A certain kind of stone used to retain heat and produce warmth.

**Soluble.** Capable of being dissolved.

**Solution.** The diffusion of a solid in a liquid.

**Solvents.** Those chemicals which break up or dissolve substances.

**Sound.** An instrument for exploring cavities or canals for diagnosis or treatment.

**Spasm.** Any sudden or convulsive action.

**Spasmodic.** Relating to or characterized by a spasm. Convulsive.

**Specialization.** Determination or limitation. **Specialist** a person devoted to one line of study, occupation or profession.

**Specific Gravity.** Comparative weight; as between urine and water.

**Speculum.** An instrument for examining cavities. *Illus.* pages 207-208.

**Spermatic Cord.** The mass of arteries, veins, nerves, absorbents and their coverings, which passes along the groin and over public bone to the testicle.

**Spermatozoa.** Male fertilizing element.

**Sphincters.** Round muscles which close natural openings.

**Spicula.** A small pointed piece of bone.

**Spinal Column.** The twenty-four bones, which, situated one above the other, form the backbone.

**Spleen.** An oval viscus behind the outer end of the stomach.

**Splint.** A support for the ends of a fractured bone.

**Sponge Tent.** Compressed dry sponge previously treated with Gum Arabic used for dilating the uterine canal.

**Sprain.** A straining or rupture of the fibrous parts of a joint.

**Spray.** Liquor vaporized by a strong air current.

**Sterility.** Barrenness. Inability to bear children.

**Sterilization.** The destruction of germs by heat.

**Sternum.** The flat bone of the breast.

**Stethometer.** An instrument to measure chest expansion.

**Stethoscope.** An instrument for examining the heart and lungs.

**Stimulants.** Medicines which increase the vital activity of the body.

**Stimulus.** Exciting action.

**Stool.** An evacuation of the bowels.

**Streptococcus.** A germ causing the septic sore throat of tonsillitis.

**Stricture.** A contracted condition of a canal or passage; of the food pipes, rectum, urethra, etc.

**Structural.** Belonging to the arrangements of tissues or organs.

**Strumous.** Scrofulous.

**strychnine.** An alkaloid of nuxvomica.

**Styptic.** Having the property of checking hemorrhage.

**Sub-acute.** Of moderate severity.

**Subnormal.** Below the normal.

**Sudoriferous Glands.** Glands which secrete perspiration. **Sweat Glands.**

**Suffocation.** A stoppage of respiration.

**Sunburn.** Dermatitis from exposure to the sun.

**Sun Stroke.** See pages 83, 424.

**Suppuration.** The formation of pus, as in an abscess or ulcer.

**Suppository.** A solid medicine for introduction into the rectum or the vagina.

**Suppression.** Stoppage or obstruction of discharges; as urine, menses, etc.

**Surgery.** Branch of medicine dealing with operative procedures.

**Suture Pins.** Pins or needles, which are passed through the edges of wounds to bring them together. Thread is then wound around the pin to hold the edges in place.

**Sutures.** The ragged edges of bones by which they are joined to each other. Stitches of thread to bring the edges of a wound together for their union.

**Symptom.** A change in the body or in its functions which indicates disease.

**Syncope.** Swooning or fainting.

**Synovial Membrane.** The lining of a joint, which from its oily secretion allows the bones to move freely upon each other.

**Synovitis.** Inflammation of a synovial membrane.

**Syphilis.** See page 424.

**Syringe.** An instrument for injecting fluids.

**Systemic Veins.** Systemic Circulation. Pertaining to the body as a whole.

## T

**Tactile.** Pertaining to the sense of touch.

**Tapping.** Removing collected fluid by introducing a hollow tube through the flesh.

**Technic, or Technique.** The method of procedure of operation. **Surgical Technic**—absolute carrying out of rules.

**Temperament.** Peculiarities of the constitution manifested by traits which we denominate character.

**Temperature.** The degree of intensity of heat or molecular vibration.

**Tendon.** One of the strong bands or cords of connective tissue forming the termination or connections of the fleshy portion of a muscle.

**Thermometer.** An instrument for determining temperature.

**Thermos Bottle.** A bottle in which heat or cold is retained.

**Thermostat.** Automatic device for regulating the temperature.

**Thigh.** The thick part of the leg.

**Thoracic Duct.** A canal which carries the chyle from its repository in the abdomen to the large vein in the chest, near the heart.

**Thorax.** Chest.

**Tinctures.** Medicines held in solution. An alcoholic solution of medicinal substance.

**Tissue.** An aggregation of similar cells and fibers forming a distinct structure.

**Tongue.** The muscular organ of taste and speech.

**Tonsillitis.** Inflammation of the gland at the beginning of the throat.

**Tourniquet.** An instrument to compress arteries.

**Toxin.** An amorphous nitrogenous poison formed by bacteria in both living tissues and dead substances.

**Trachea.** The windpipe. The cartilaginous tube extending from the larynx to the bronchia.

**Tract.** A distinct, more or less defined region, longer than it is broad. Any one of the columns of white matter of the spinal cord.

**Tricuspid Valve.** Valve on the right side of the heart.

**Trunk.** The main stem or body of a structure as of a nerve or a blood vessel. The body as distinguished from its appendages—limbs, neck, head, etc.

**Truss.** A mechanical appliance for preventing protrusion or strangulation. Hernial support.

**Tuberculosis.** An infectious disease due to a specific bacillus characterized by the formation of tubercles.

**Tumor.** An abnormal enlargement.

**Turn of life.** The change of life when menstruation ceases.

**Twilight Sleep.** The morphine-scopolamin treatment for painless child birth.

**Tympanum.** Eardrum.

**Typhoid Fever.** A continued acute, infectious fever, with intestinal lesions, eruptions, etc.

**Typhus.** An epidemic contagious fever, with eruption and great depression, but no lesion.

## U

**Ulcer.** An open sore.

**Ulceration.** Pertaining to ulcers.

**Umbilical.** Of the navel; as umbilical hernia.

**Umbilical Cord.** A cordlike substance which conveys the blood to the fetus from the placenta or after-birth.

**Umbilicus.** The navel.

**Uræmic.** Pertaining to blood poisoning from the presence of urea in the circulation.

**Urates.** The pinkish deposit found in urine.

**Urea.** A constituent of the urine.

**Ureters.** The canals leading from the kidneys to the bladder. *Illus.* page 265.

**Urethra.** The canal leading from the bladder outwards, by which the urine is voided.

**Uric Acid.** A constituent of the urine.

**Urinary Fistula.** Abnormal communication between the urinary passages and the surface.

**Urine.** The excretion of the kidney.

**Urino-genital Organs.** Pertaining to the urinary and sexual organs.

**Uterine.** Belonging or relating to the womb.

**Uterine Cavity or Canal.** From the mouth of the womb to a constriction called the internal orifice, is a cylindrical space called the canal. Above this to the fundus or base is a triangular and flat space called the cavity.

**Uterus.** The womb—the hollow female organ of gestation.

## V

**Vagina.** A canal, five or six inches long, situated between the vulva and womb.

**Valve.** A fold across a canal obstructing passage in one direction.

**Vapor.** Steam.

**Varicose.** Veins that are twisted or dilated.

**Vascular.** Belonging or relating to vessels.

**Vascular System.** The heart and blood-vessels.

**Veins.** The vessels which return the blue blood to the heart.

**Ventricles.** Chambers in the heart.

**Version.** Displacement of the womb forwards or backwards.

**Vertebrae.** The twenty-four bones which joined together form the backbone.

**Vertigo.** Dizziness.

**Vesical Calculus.** A concretion in the bladder.

**Vessels.** Tubes containing the fluids of the body.

**Vibrations.** Oscillations, swaying, waves.

**Virulent.** Noxious, malignant. Having the nature of a poison.

**Virus.** Poison. The agent which transmits infectious disease.

**Viscus.** Any organ inclosed within the cranium, thorax, abdominal cavity or pelvis.

**Vision.** Sight. To see.

**Vital.** Pertaining to life.

**Vitreous.** Glass-like. Vitreous humor. a transparent jelly-like humor or body that fills the ball of the eye.

**Vulva.** The external organs of generation in the female, or the opening between these projecting parts.

## W

**White Matter.** In the brain consisting of nerve fibers.

**Whites.** Described on page 200.

**Womb.** See Uterus.

**Wound.** Break in continuity of soft parts of the body, an injury.

## X

**X-Rays.** Or Roentgen Rays. The peculiar ether rays or waves which penetrate through opaque matter by means of which photographs may be taken of bones, metallic substances, etc., situated in the tissues.

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